August 23, 1996

MEMORANDUM

TO: Orville D. Green, Assistant Administrator
Permits and Enforcement

FROM: Brian R. Monson, Chief
Operating Permits Bureau

SUBJECT: Issuance of Tier II Operating Permit #031-00026 to Sinclair Oil Corporation (Burley)

PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 of the Rules for the Control of Air Pollution in Idaho (Rules) for issuing Operating Permits.

PROJECT DESCRIPTION

This project is for the issuance of a Tier II Operating Permit (OP) for the Sinclair Oil Corporation facility, located in Burley, Idaho, in order to establish the facility as a synthetic minor source for hazardous air pollutants (HAPs). As a synthetic minor source of HAPs, the facility will be considered an "area source" for the Bulk Gasoline Distribution MACT standard. Emission sources existing at the facility are as follows: four (4) storage tanks capable of storing gasoline or distillate fuel oil grade petroleum product, three (3) storage tanks to store distillate fuel oil grade petroleum product, one transmix tank to store "slop oil", one prover tank utilized for flow calibrations, one double bay submerged top fill loading rack, and process piping fugitive emission sources.

SUMMARY OF EVENTS

On September 12, 1995, DEQ received an application for a Tier II OP. This application was declared administratively complete on October 12, 1995. Additional information was received on November 29, 1995, and on January 10, 1996. On February 16, 1996, a proposed Tier II OP was issued for public comment. A public comment period was then held from March 1, 1996, to April 1, 1996.

On March 21, 1996, DEQ received comments about the content of the proposed OP. These comments were addressed by DEQ in the response package and incorporated into the operating permit.

On April 29, 1996, DEQ received a formal request for a stay of permit issuance, which was honored. On June 17, 1996, DEQ received a submittal from Sinclair requesting revisions to the original proposed Tier II OP.

RECOMMENDATIONS

Based on the review of the Tier II Operating Permit application, additional supporting information submittals, and applicable state and federal regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Sinclair Oil Corporation, in Burley, be issued a Tier II Operating Permit. The facility has already submitted the permit application fee of $500.00 as required by IDAPA 16.01.01.470 of the Rules.

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cc: R. Lupton, SCIRO
OP File Manual
Source File
COF

August 23, 1996

MEMORANDUM

TO: Brian R. Monson, Chief
Operating Permits Bureau
Permits and Enforcement

FROM: Darrin A. Mehr, Air Quality Engineer
Operating Permits Bureau
Wade C. Woolery, Air Quality Engineer
Technical Services Bureau

THROUGH: Susan J. Richards, Air Quality Permits Manager
Operating Permits Bureau

SUBJECT: Supplemental Technical Analysis for Tier II Operating Permit (#031-00026)
Sinclair Oil Corporation (Burley)

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 of the Rules for the Control of Air Pollution in Idaho (Rules) for issuing Operating Permits.

This memorandum documents the changes in the Tier II Operating Permit's (OP) after the close of the public comment period, and revised DEQ policy for issuing permits.

FACILITY DESCRIPTION

Sinclair Oil Corporation's (Sinclair) Burley, Idaho, facility distributes petroleum products received through the Chevron supply pipeline originating in Salt Lake City, Utah. Petroleum products consisting of various grades of gasoline and distillate fuel oil are temporarily stored in tanks prior to transfer to mobile carrier tanks for transport and delivery off-site.

Petroleum products consisting of various grades of distillate fuel oil and gasoline are received by the facility through a pipeline. The petroleum products are stored in any of seven (7) existing storage tanks. Gasoline is allowed to be stored in four of these tanks, and fuel oil can be stored in any of the seven (7) existing tanks. A "prover" tank is used for flow calibration, and a "trans-mix" tank is used to store "slop oil." The petroleum products are transferred from the tanks to the carrier by the loading rack system, prior to off-site transport and delivery.

Storage tanks #301, #304, #311, and #321 are capable of storing any grade of distillate fuel oil as well as gasoline. Storage tanks #302, #305, and #306 can only store distillate fuel oil.

The carrier is situated in one of the two (2) loading rack bays where one or more loading rack arms are attached to the carrier tank. Either a gasoline or a distillate fuel oil product is transferred from the storage tank to the loading rack system, which delivers the product to the carrier tank. Additives may be blended with the gasoline or distillate fuel oil product during loading of the carrier tank.

Fugitive VOC and HAP emissions occur from process equipment including valves, pump seals, flanges, open-end connections, and process drains.

PROJECT DESCRIPTION

This project is for the development of an OP that will create state and federally enforceable limitations on the facility's potential to emit hazardous air pollutants (HAPs). This permit would make the Burley facility a synthetic minor for HAP emissions, which allows the facility to be recognized as an "area source" for HAPs. Bulk gasoline distributors that are recognized as area sources of HAPs avoid the stringent control technology installation requirements of the Bulk Gasoline Distribution MACT standards.

Refer to the technical memorandum dated February 16, 1996 (Mehr and Woolery through Richards to Monson) for a description of the sources present at the facility.

SUMMARY OF EVENTS

On September 12, 1995, the Division of Environmental Quality (DEQ) received an application for a Tier II OP. This application was declared administratively complete on October 12, 1995. Additional information was received on November 29, 1995, and on January 10, 1996. On February 16, 1996, a proposed Tier II OP was issued for public comment. The public comment period started March 1, 1996, and ended on April 1, 1996.

On April 29, 1996, DEQ received a formal request from Sinclair to hold issuance of the Tier II OP. This request was honored by DEQ, and permit issuance was stayed. On June 17, 1996, DEQ received a submittal from Sinclair containing a request for revisions to the original OP.

DISCUSSION

1. Emission Estimates

Emission estimates were originally provided by Sinclair in the September 12, 1995, submittal. Additional supporting calculations and documentation were included in the November 29, 1995, and January 10, 1996, submittals.

The product throughputs for gasoline and distillate fuel oil at the loading rack were altered by Sinclair in the June 17, 1996, submittal. Revised throughputs as listed below were used in the spreadsheet that underwent review during the original public comment period.

Product	Proposed Permit Requested Throughput (U.S. gallons per year)	Revised Throughput (U.S. gallons per year)
Gasoline	259,077,000	107,310,000
Distillate Fuel Oil	311,199,000	462,996,000

The intent of this Tier II OP application is to establish enforceable emission limits for HAPs below the 10/25 ton per year (T/yr) thresholds for single/aggregated HAPs. The issuance of this OP will establish Sinclair's Burley facility as an area (nonmajor) source and will exempt them from the requirements of the final MACT standard for Bulk Gasoline Distributors. The facility is a major source of VOCs, as both potential and actual annual VOC emissions exceed the 100 T/yr threshold.

Emission Estimates Conclusions

Allowable annual throughputs remained as requested in the Sinclair June 17, 1996, submittal and should allow Sinclair a comfortable degree of operational flexibility and expansion above current actual operations. Additional information is included in the attachment and the original proposed Tier II OP.

Daily throughput limits as listed in the February 16, 1996, technical memorandum will not be incorporated. Hourly emission limits were developed using the rated capacity of the emissions units/processes. The goal of the Tier II OP was intended to limit only the annual emissions of pollutants. No ambient air quality impacts were assessed for the facility, as the Permittee has stated all emissions units covered in the permit qualify as grandfathered sources.

Facility-wide annual potential emissions are:

POLLUTANT	POTENTIAL EMISSIONS (Tons per year)
Volatile Organic Compounds (VOCs)	298.39
Aggregated Hazardous Air Pollutants (HAPs)	8.38
Individual HAPs: Benzene	1.60
Ethyl benzene	0.17
Hexane	2.56
Naphthalene	0.0053
Toluene	2.39
Trimethylpentane 2,2,4 (Iso-Octane)	0.58
Xylenes (isomers m-, o-, and p- combined)	1.07

Appendix A of the proposed Tier II OP originally contained individual HAP emission limits for hexane and toluene to demonstrate that the 10 T/yr major source threshold for single HAP emissions were not encroached upon. Hexane and toluene were the largest single HAP emissions in comparison to the other HAPs inventoried. These limits have been dropped from Appendix A of the final permit because the emission levels have been drastically reduced, and an aggregated HAPs emission limit will suffice.

Revisions to Proposed Permit Due to Supplemental DEQ Review

Equipment and emissions control devices and methods listed in the OP issued for public comment have been removed in accordance with current Department permitting methods. These items are listed here to document the existing sources and provide a basis for determining the facility's potential emissions.

The following section contains the information deleted from the proposed Tier II OP.

<u>Storage Tanks</u>
Tanks #301, #304, #311, and #321 are allowed to store either gasoline or any grade of distillate fuel oil. Each tank is sixty (60) feet in diameter and has an 838,437 gallon capacity. VOC and HAP emissions from these tanks are controlled by an external floating roof.

Tanks #302, #305, and #306 are only allowed to store distillate fuel oil product. Each tank is sixty (60) feet in diameter and has a storage capacity of 825,024 gallons. These tanks have a fixed roof, and emissions are uncontrolled.

Additional tanks at the facility include the Trans-mix and Prover tanks. Each of these tanks has a fixed roof, and emissions are uncontrolled. The proposed Tier II OP contained VOC and HAP emission limits for the Trans-mix tank. No monitoring of throughput was to be required for this source because an unknown portion of total throughput is water and other process wastes. Emission estimates for Trans-mix Tank #300 are:

- VOCs: 0.05 lb/hr and 0.21 T/yr
- Aggregated HAPs: 0.001 lb/hr and 0.006 T/yr

<u>Loading Rack</u>
The loading rack has two (2) bays that operate on the bottom fill method, which is the method for controlling VOCs and HAPs emissions.

Fugitive Emissions

Fugitive VOCs and HAPs are emitted from equipment at the facility. Fugitive VOC emissions were estimated to be 0.29 lb/hr and 1.26 T/yr. Fugitive aggregated HAP emissions were estimated to be 0.048 lb/hr and 0.21 T/yr. The documentation of emission factors is contained in the February 16, 1996, proposed Tier II OP's technical memorandum.

The following equipment was included in the analysis:

Gasoline Service

Pump Seals:	6
Valves:	99
Flanges:	212
Process Drains:	2
Oil/Water Separator:	0

Distillate Fuel Oil Service

Pump Seals:	3
Valves:	76
Flanges:	158
Process Drains:	0
Oil/Water Separator:	0

Summary of Changes Made to Proposed Permit

- Allowable distillate fuel product throughput increased, and gasoline decreased at loading rack.
- Allowable loading rack VOC and HAP emissions decreased by reduction of the gasoline throughputs.
- Individual HAP emission limits were removed from Appendix A of the OP.
- All facility equipment and process information were removed from the OP.
- Fugitive emission sources and emission limits were removed from the OP.
- Emission limits for the Trans-mix tank were removed from the OP.

Monitoring Requirements

Monitoring requirements for the purpose of demonstrating compliance with the annual emissions limits for the facility will consist only of monitoring of the type of product (gasoline or distillate fuel oil) and the number of gallons of each substance transferred from the supply pipeline to the storage tanks, and the amount in gallons transferred for off-site delivery through the loading rack. The product information must be monitored and recorded contemporaneously as the products are received and transferred to storage tanks, and as the products are transferred through the loading rack to off-site delivery vehicles. There are no specific daily throughput restrictions at either the loading racks or the storage tanks. Rather, the short-term emission limits are based upon the hourly capacity of equipment and the physical properties of the petroleum products. There is no feasible method for Sinclair to document compliance with the short-term emission limits. The variability in gasoline volatility, as well as seasonal temperature and throughput variations, lends itself to verification that the annual emissions limits are complied with by the facility.

For this reason, the facility will be required to monitor and record the product throughputs contemporaneously with the transfer to storage tanks and from the loading rack. This information is to be compiled on a monthly basis, and the monthly throughput totals will be compared to the twelve (12) month allowable product throughputs. Compliance will be determined on a twelve (12) month rolling summation basis, thus providing a method for determining compliance with the OP's allowable emissions for any twelve (12) month period (established after the first twelve (12) month period). This method of compliance demonstration should not place undo burdens on Sinclair, as the amounts of product received and transferred is already monitored for internal inventorying purposes.

Sinclair will not be required to monitor the Reid Vapor Pressure and individual HAPs for this permit, because the applicant and the Department have not utilized a variable RVP and HAP content approach in developing the permit emission limits.

2. Modeling

No modeling was performed to assess the ambient air quality impacts of this facility.

3. Area Classification

Sinclair's Burley facility is located in Cassia County, which is designated as either in attainment or unclassifiable for all criteria air pollutants.

The facility is located AQCR 64, Zone 11.

4. Facility Classification

The facility is not a designated facility as defined by IDAPA 16.01.01.006.25 of the Rules. (Petroleum storage capacity of the facility is approximately 5.834 million gallons. Designated facility threshold is 12.6 million gallons storage capacity).

The facility is classified as an A1 source due to permitted VOC emission limits in excess of 100 T/yr.

5. Regulatory Review

This Tier II OP is subject to the following regulatory requirements:

a.	IDAPA 16.01.01.006 & 7	Definitions
b.	IDAPA 16.01.01.401	Tier II Operating Permit
c.	IDAPA 16.01.01.403	Permit Requirements for Tier II Sources
d.	IDAPA 16.01.01.404.01	Opportunity for Public Comment
e.	IDAPA 16.01.01.404.01(c)(v)	Consideration of Comments and Final Action
f.	IDAPA 16.01.01.404.04	Authority to Revise or Renew Operating Permits
g.	IDAPA 16.01.01.406	Obligation to Comply
h.	IDAPA 16.01.01.470	Permit Application Fees for Tier II Permits
i.	IDAPA 16.01.01.650	General Rules for the Control of Fugitive Dust
j.	IDAPA 16.01.01.728	Sulfur Content Limit for Distillate Fuel Oil
k.	Section 37-2506,Idaho Code	Quality Standards for Motor Gasoline and Distillate Fuel Oil-Specifications Set By American Society of Testing and Materials
l.	40 CFR Part 80.27	Controls and Prohibition on Gasoline Volatility

FEES

Fees apply to this facility in accordance with IDAPA 16.01.01.470 of the Rules. The facility is subject to permit application fees for Tier II permits in the amount of five hundred dollars ($500.00). Sinclair has already submitted this payment to DEQ with the application.

Fees in accordance with IDAPA 16.01.01.525 of the Rules for major facilities that meet the potential to emit requirements of IDAPA 16.01.01.008.14 of the Rules apply to this facility. Registration of pollutants and registration fees will be established by the issued Tier II OP's allowable VOC emissions.

RECOMMENDATIONS

Based on the review of the Tier II OP application materials and of applicable State of Idaho and federal regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Sinclair Oil Corporation, in Burley, Idaho, be issued a Tier II OP for the sources that exist at the facility. An additional opportunity for public comment on the air quality aspects of the permit is not required. All memoranda for the project shall be provided to the public and facility for this final action. Staff also recommends that the company be notified of the pollutant registration and registration fee requirements pursuant to IDAPA 16.01.01.525 of the Rules in writing.

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cc: R. Lupton, SCIRO
Source File
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ATTACHMENT A

Revised Emissions Estimation Spreadsheet

Title V Engineer:	DM	
Company Name:	Sinclair Oil Corp.	
Location:	Burley, Idaho	
Date Created:	January 4, 1996	
Today's Date:	07/15/96	

This spreadsheet is updated from the section specifiied as "Annual Average Method" on
The section immediately below (monthly basis) has not been altered to reflect gasoline RVP 11.
Requested throughputs of 107,310,000 gallons gasoline and 462,966,000 gallons distillate fuel oil.
(listed in the Tier II Permit revision request letter received June 17, 1996/S. Greene, P.E. to O. Green)

BURLEY, IDAHO FACILITY

Calculation of Loading Rack Emissions

ASSUMPTIONS

1. TANKS2.0 provides the monthly average true vapor pressure of the gasoline product AND the molar fraction of HAP constituents in the vapor phase of the gasoline product.

2. Trimethylpentane 2,2,4 is also known as iso-octane.

3. Discussions with EPA Region X and the resulting discussions between EPA Region X and Research Triangle Park reveal that gasoline emissions of the three Xylene isomers should be aggregated under a heading of Xylene (mixtures).

4. A comparison between the single "annual" and individual monthly runs of emissions from TANKS2.0 to derive vapor phase HAP and VOC percentages of composition revealed that the rounding of values due to significant figures predicts greater emissions for the detailed monthly run.

5. The most vital assumption made with this analysis is that it assumes an identical chemical composition throughout the year. The most accurate method for estimating all emissions would be to have samples of gasoline chemical composition for EACH of the different Reid Vapor Pressure (RVP) categories. RVP is determined by chemical composition physical properties. Therefore, the acceptance of a single gasoline chemical composition is an important assumption for DEQ to accept. The applicant has further stated that this information would be difficult, if not impossible, to deliver because they may receive gasoline product from refineries other than their own corporation's.

6. The loading rack emissions for Burley facility should incorporate bottom load methodology. This results in the same emission estimates.

ANNUAL AVERAGE VAPOR PHASE HAP FRACTION METHOD:

Notes and concerns:

1. EPA has recently made available revised interim emission factors to estimate fugitive emissions from Marketing terminals. The document is titled New Equipment Leak Emission Factors for Petroleum Refineries, Gasoline Marketing, and Oil & Gas Production Operations, February 1995. These emission factors are presented both for the screening method (where a known concentration of VOCs is emitted) and the "average" emission factor method, which requires no monitoring data). The "average" emission factor method is to be used just as in the applicant's submittal. These 1995 emission factors will replace the applicant's emission estimates that employed EPA AP-42 emission factors published in 1980.

2. EPA AP-42 Section 5.2 - Transportation and Marketing of Petroleum Products, January, 1995. This relationship was used to estimate annual VOC and HAP loading rack emissions. The document states that it has within a + or - 30 percent probable error.

ANNUAL LOADING RACK EMISSIONS using an ANNUAL AVERAGE MOLE FRACTION

GASOLINE SERVICE

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure of liquid delivered, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute bulk liquid temperature , °R

L_L =	see Chart
S = see	1.00
P =	3.2269
M =	66.47
T =	506.6

ANNUAL Gasoline Throughput, gallons per year = 107310.0 E^3 gallons

ANNUAL

HAPs Compounds	Mole Fraction	L_L (lb/10 ^{3} gal)	Emissions (Ton/YEAR)
Benzene	0.0054	0.0285	1.53
Ethylbenzene	0.0005	0.0026	0.14
Hexane	0.0087	0.0459	2.46
Naphthalene	0.0000	3.14E-06	1.69E-04
Toluene	0.0076	0.0401	2.15
Trimethylpentane (2,2,4)	0.0019	0.0100	0.54
Xylene-m	0.0013	0.0069	0.37
Xylene-o	0.0006	0.0032	0.17
Xylene-p	0.0010	0.0053	0.28
Gasoline (RVP-10)	0.9730	5.1330	275.41
TOTAL			283.05
TOTAL--HAPS ONLY			7.64

XYLENE (mixture)
0.82 tons per year

DISTILLATE FUEL OIL SERVICE

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure of liquid delivered, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute bulk liquid temperature , °R

L_L =	see chart below
S = see	1.00
P =	0.0046
M =	129.04
T =	506.6

ANNUAL Distillate Fuel Oil Throughput, gallons per year = 462996.0 E^3 gallons

ANNUAL

HAPs Compounds	Mole Fraction	L_L (lb/10 ^{3} gal)	Emissions (Ton/YEAR)
Naphthalene	0.0005	7.30E-06	0.002
Toluene	0.0102	0.0001	0.034
Xylene-m	0.0115	0.0002	0.039
Xylene-o	0.0031	0.0000	0.010
Distillate Fuel Oil #2	0.9747	0.0142	3.294
TOTAL	1.0000		3.380
TOTAL--HAPS ONLY			0.086

XYLENE (mixture)
0.05 tons per year

TYPICAL STORAGE TANK EMISSIONS

Emissions are estimated using TANKS2 and are for a SINGLE storage tank, except as noted.

Storage tank emissions are comprised of: Withdrawal, roof-fitting, rim-seal, and standing losses.

Gasoline Storage Tanks

Tanks 301, 304, 311, 321

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Benzene	0.0032	0.0141
Ethylbenzene	0.0009	0.0039
Hexane	0.0048	0.0210
Naphthalene	0.0000	0.0002
Toluene	0.0067	0.0293
Trimethylpentane (2,2,4)	0.0014	0.0060
Xylene-m	0.0020	0.0088
Xylene-o	0.0013	0.0059
Xylene-p	0.0019	0.0081
Gasoline (RVP-10)	0.4943	2.1648
TOTAL VOCs	0.516	2.262
TOTAL--HAPS ONLY	0.022	0.097

For the four (4) Tanks:

TOTAL VOCs	2.066	9.048
TOTAL--HAPS ONLY	0.089	0.389

Tanks Transmix and Prover

Emissions are nearly identical (per applicant's submittal) to each other so the Transmix Tank results will be used for both tanks.

Data for Transmix and Prover Tanks is from the applicant's submittal.

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Benzene	0.0003	0.0011
Ethylbenzene	0.0000	0.0001
Hexane	0.0004	0.0018
Naphthalene	0.0000	0.0000
Toluene	0.0004	0.0016
Trimethylpentane (2,2,4)	0.0001	0.0005
Xylene-m	0.0001	0.0003
Xylene-o	0.0000	0.0001
Xylene-p	0.0000	0.0002
Gasoline (RVP-10)	0.0469	0.2053
TOTAL VOCs	0.0482	0.2109
TOTAL--HAPS ONLY	0.0013	0.0056

For the two (2) Tanks:

TOTAL VOCs	0.0963	0.4219
TOTAL--HAPS ONLY	0.0026	0.0112

DISTILLATE FUEL OIL STORAGE TANKS

TANKS 302, 305, 306

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Naphthalene	0.0000	0.0002
Toluene	0.0009	0.0041
Xylene-m	0.0011	0.0047
Xylene-o	0.0003	0.0013
Distillate Fuel Oil #2	0.0909	0.3979
TOTAL VOCs	0.0932	0.4083
TOTAL--HAPS ONLY	0.0024	0.0103

For the three (3) Tanks:

TOTAL VOCs	0.2796	1.2248
TOTAL--HAPS ONLY	0.0071	0.0310

STORAGE TANK SUMMARY

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Benzene	0.0133	0.0584
Ethylbenzene	0.0036	0.0157
Hexane	0.0200	0.0875
Naphthalene	0.0003	0.0013
Toluene	0.0303	0.1326
Trimethylpentane (2,2,4)	0.0057	0.0249
Xylene-m	0.0114	0.0500
Xylene-o	0.0063	0.0275
Xylene-p	0.0075	0.0330
Gasoline OR Fuel Oil	2.3433	10.2639
TOTAL VOCs	2.4417	10.6949
TOTAL--HAPS ONLY	0.0984	0.4310

Xylenes (mixture): 0.1105 Tons/yr

FUGITIVE EMISSIONS **Burley Facility**

Notes and Comments: (Response to Public Comment)

1. The application materials did in fact account fugitive emissions occurring for 8760 hours per year.

2. The fugitive emissions will be estimated using the revised emission factors published in the EPA Protocol for Equipment Leak Emission Estimates, November 1995, EPA-453\R-95-017. Sinclair Oil Corp. has requested in public comment that these be used in place of the 1995 "Interim" Average emission factors used to establish emission limits in the proposed permit. Those emission factors are incorporated below. Result: There is no appreciable difference between emissions estimated with the interim and November,1995 Protocol factors.

3. The number of emissions sources is provided by the applicant.

SOURCE	# of Sources	Emission Factor (lb/hr/source)	Total VOC Emissions (lb/hr)	Assumed Hours/yr Operation	Total VOC Emissions (Tons/year)
GASOLINE (light liquid):					
Pump Seals	6	1.2E-03	0.007	8760	0.032
Valves	99	9.5E-05	0.009	8760	0.041
Flanges	212	1.8E-05	0.004	8760	0.017
Process Drains *1	2	0.07	0.140	8760	0.613
Oil/Water Separator	0		0.000	8760	0.000
		Lb/hr totals:	**0.160**	**Ton/yr totals:**	**0.703**
DISTILLATE FUEL OIL (heavy liquid) *2					
Pump Seals	3	2.9E-02	0.086	8760	0.377
Valves	76	5.5E-05	0.004	8760	0.018
Flanges	158	2.4E-04	0.038	8760	0.168
Process Drains *1	0	0.07	0.000	8760	0.000
Oil/Water Separator	0		0.000	8760	0.000
		Lb/hr totals:	**0.128**	**Ton/yr totals:**	**0.563**

Fugitive Grand Total: 0.29 lb/hr 1.27 Ton/yr

*1 Emission factor for the drain is from AP-42 Table 9.1-2 Fugitive Emission Factors for Petroleum Refineries, October/1980
*2 Distillate fuel oil emission factors are from the August 1995 AP-42 Interim Emission Factors for Oil and Gas Production Operations

HAP Emissions = VOC Emission Rate * HAP Liquid Mass Fraction

FUGITIVE HAP EMISSIONS (Gasoline Service)

HAP Component	Liquid Mass Fraction	VOC Emis Rate (lb/hr)	HAP Emission Rate (lb/hr)	VOC emis Rate (Tons/year)	HAP Emission Rate (Tons/year)
Benzene	0.0188	0.0030	0.0030	0.0132	0.0132
Ethylbenzene	0.0207	0.0033	0.0033	0.0145	0.0145
Hexane	0.0181	0.0029	0.0029	0.0127	0.0127
Naphthalene	0.0013	0.0002	0.0002	0.0009	0.0009
Toluene	0.0972	0.0156	0.0156	0.0683	0.0683
Trimethipentane 2,2,4	0.0151	0.0024	0.0024	0.0106	0.0106
Xylene (-m)	0.0448	0.0072	0.0072	0.0315	0.0315
Xylene (-o)	0.0349	0.0056	0.0056	0.0245	0.0245
Xylene (-p)	0.0448	0.0072	0.0072	0.0315	0.0315
Gasoline (RVP 10)	0.7043	0.1130	0.0000	0.4949	0.0000
Totals:	1.0000	0.1604	0.0474	0.703	0.208

FUGITIVE HAP EMISSIONS (Distillate Fuel Oil Service)

HAP Component	Liquid Mass Fraction	VOC Emis Rate (lb/hr)	HAP Emission Rate (lb/hr)	VOC Emis Rate (Tons/year)	HAP Emission Rate (Tons/year)
Benzene	0.000028	0.000004	0.000004	0.000016	0.000016
Naphthalene	0.001700	0.000218	0.000218	0.000957	0.000957
Toluene	0.000200	0.000026	0.000026	0.000113	0.000113
Xylene (-m)	0.000300	0.000039	0.000039	0.000169	0.000169
Xylene (-o)	0.000600	0.000077	0.000077	0.000338	0.000338
Xylene (-p)	0.000000	0.000000	0.000000	0.000000	0.000000
Distillate Fuel Oil #2	0.997172	0.128121		0.561169	
Totals:	1.0000	0.1285	0.00036	0.5628	0.0016

Emissions and Allowable Throughput Summary - Burley, Idaho Facility
Based upon Letter received June 17, 1996/Greene to Green-Submittal of Revised Allowable Emissions

SOURCE IDENTIFICATION	ALLOWABLE EMISSIONS Volatile Organic Compounds (lb/hr)	(Tons/yr)	Aggregated Hazardous Air Pollutants (lb/hr)	(Tons/yr)	Allowable Throughput (Gallons/yr)	Allowable Product Type
STORAGE TANKS						
Tank 301	0.52	2.26	0.022	0.097	86,359,000	Gasoline
Tank 304	0.52	2.26	0.022	0.097	86,359,000	Gasoline
Tank 311	0.52	2.26	0.022	0.097	86,359,000	Gasoline
Tank 321	0.52	2.26	0.022	0.097	86,359,000	Gasoline
	2.07	**9.05**	**0.09**	**0.39**		
Tank 302	0.09	0.41	0.002	0.010	155,599,500	Distillate Fuel Oil
Tank 305	0.09	0.41	0.002	0.010	155,599,500	Distillate Fuel Oil
Tank 306	0.09	0.41	0.002	0.010	155,599,500	Distillate Fuel Oil
	0.28	**1.22**	**0.01**	**0.03**		
Transmix Tank 400	0.05	0.21	0.001	0.006	38,080	Gasoline
Prover Tank	0.05	0.21	0.001	0.006	220,200	Gasoline
	0.10	**0.42**	**0.003**	**0.011**		
LOADING RACK						
Gasoline Service	64.62	283.05	1.74	7.64	107,310,000	Gasoline
Distillate Fuel Oil Service	0.77	3.38	0.02	0.09	462,996,000	Distillate Fuel Oil
	65.40	**286.43**	**1.76**	**7.73**		
FUGITIVES						
Gasoline Service	0.160	0.703	0.047	0.208	N/A	
Distillate Fuel Oil Service	0.128	0.563	0.000	0.002	N/A	
	0.289	**1.265**	**0.048**	**0.209**		
Total Emissions:	**68.13**	**298.39**	**1.91**	**8.37**		

Notes:
N/A stands for Not Applicable

Annual storage tank emissions are derived from the EPA/API TANKS2.0 program.

Response to Comments and Questions Submitted During a Public Comment Period on Sinclair Oil Corporation (Burley) Proposed Tier II Operating Permit (OP) for the Entire Facility

COMMENTS AND RESPONSES

Comment #1: Sinclair Oil Corporation (SOC) has identified the following administrative corrections to the proposed Permit:

Page 2 of 10, Section 1.1, Process Description, 3rd sentence should read: "Gasoline is allowed to be stored in four of these tanks..."

Page 4 of 10, Section 1.1, Process Description, 2nd sentence should read: "...where one or more loading rack arms are attached to the carrier." Note that the loading rack is a bottom loading system and not a top loading system.

DEQ Response: The permit text has been altered as noted above. The descriptions were also altered in Sections 1.2 and 1.3 of the same page to reflect this comment.

There is no difference in estimated emissions between the two loading rack systems.

Comment #2: Fugitive Emissions: The fugitive emission calculation submitted with the Permit application was based upon Refinery Average Emission Factors applied at 8,760 hours per year. Subsequent to Permit application submittal, the protocol document has been revised. The new revision includes Marketing Terminal Average Emission Factors which are directly applicable to fugitive sources in light liquid (i.e., gasoline) service. SOC believes these factors more accurately reflect the fugitive emissions from light liquid service at this facility. Inclusion of the new factor significantly reduces the fugitive VOC and HAP emission from the facility and SOC supports the use of these factors for this application. The Division's technical analysis utilized "Interim" Emissions Factors for light liquid service which correspond closely to the Marketing Terminal Average Emission Factors.

With regard to emissions from fugitive sources in heavy liquid (i.e., fuel oil) service, neither the Interim factors nor the Marketing Terminal Average Emission Factors include corresponding factors for fuel oil service. The Division utilized "light oil" from Average Emission Factors for Oil and Gas Production Operations for the fuel oil emission factors. SOC is concerns with the use of the "Oil and Gas Production" factors for fuel oil service because these factors result in a higher emissions (lb/hr/source) than the corresponding gasoline service factors.

Fugitive emissions from gasoline service tend to be greater than fugitive emissions from fuel oil service. SOC also recognizes that more accurate factors may not yet be developed for the fuel oil service application. Although the fuel oil service factors used in the technical analysis overpredict fugitive fuel oil emission, thus providing a conservative estimate of these emissions, SOC agrees with the Division's assessment of fugitive emissions from fuel oil service.

DEQ Response: **Gasoline Service**

SOC is correct in stating that the original permit application estimated fugitive volatile organic compounds (VOCs) and hazardous air pollutant (HAPs) emissions continuously--or 8760 hours per year.

The 1993 EPA Protocol for Equipment Leak Emission Estimates[1] (1993 Protocol) was used to set emission limits in the permit application. The 1995 "Interim" emission factors[2] used to establish the proposed permit's emission limits were much smaller than those in the 1993 Protocol. This accounted for a lower level of allowable fugitive emissions in the proposed permit than originally applied for.

The "Interim" emission factors for pump seals, valves, and flanges in light liquid (gasoline) service are either identical, or nearly so, when compared to the Marketing Terminal Average Emission Factors, published in the 1995 Protocol[3]. Fugitive emissions from gasoline service were recalculated using the 1995 Protocol emission factors (see attachment). The difference in estimated fugitive emissions was negiligible. Therefore, the allowable pollutant emissions permit limits and gasoline throughput limits will remain unchanged.

Distillate Fuel Oil Service

DEQ agrees with SOC's comment that fugitive emissions from gasoline service should be greater than for distillate fuel oil service. At the present time there are no Marketing Terminal Average Emission factors for distillate fuel oil service. In the absence of actual screening values for the distillate fuel oil service emission sources, DEQ maintained that the apparently conservative emission factors used in the proposed permit's analysis provided the best option available. The final result and goal of this Tier II Operating Permit is to establish the facility as a "synthetic minor" for HAPs emissions.

---

1 Protocol for Equipment Leak Emission Estimates, EPA-453\R-93-026, June 1993, USEPA.

2 New Equipment Leak Emissions Factors for Petroleum Refineries, Gasoline Marketing and Oil and Gas Production Operations, February 1995, USEPA.

3 Protocol for Equipment Leak Emission Estimates, EPA-453\R-95-017, November 1995, USEPA.

FUGITIVE EMISSIONS   Burley Facility

Notes and Comments: (Response to Public Comment)

1. The application materials did in fact account fugitive emissions occurring for 8760 hours per year.

2. The fugitive emissions will be estimated using the revised emission factors published in the EPA Protocol for Equipment Leak Emission Estimates, November 1995, EPA-453\R-95-017. Sinclair Oil Corp. has requested in public comment that these be used in place of the 1995 "Interim" Average emission factors used to establish emission limits in the proposed permit. Those emission factors are incorporated below. Result: There is no appreciable difference between emissions estimated with the interim and November,1995 Protocol factors.

3. The number of emissions sources is provided by the applicant.

SOURCE	# of Sources	Emission Factor (lb/hr/source)	Total VOC Emissions (lb/hr)	Assumed Hours/yr Operation	Total VOC Emissions (Tons/year)
GASOLINE (light liquid):					
Pump Seals	6	1.2E-03	0.007	8760	0.032
Valves	99	9.5E-05	0.009	8760	0.041
Flanges	212	1.8E-05	0.004	8760	0.017
Process Drains *1	2	0.07	0.140	8760	0.613
Oil/Water Separator	0		0.000	8760	0.000
		Lb/hr totals:	0.160	Ton/yr totals:	0.703
DISTILLATE FUEL OIL (heavy liquid) *2					
Pump Seals	3	2.9E-02	0.086	8760	0.377
Valves	76	5.5E-05	0.004	8760	0.018
Flanges	158	2.4E-04	0.038	8760	0.168
Process Drains *1	0	0.07	0.000	8760	0.000
Oil/Water Separator	0		0.000	8760	0.000
		Lb/hr totals:	0.128	Ton/yr totals:	0.563

The original analysis estimated emissions at 0.702 ton/yr. This is not significant.

Fugitive Grand Total: 0.29 lb/hr 1.27 Ton/yr

*1 Emission factor for the drain is from AP-42 Table 9.1-2 Fugitive Emission Factors for Petroleum Refineries, October/1980
*2 Distillate fuel oil emission factors are from the August 1995 AP-42 Interim Emission Factors for Oil and Gas Production Operations

HAP Emissions = VOC Emission Rate * HAP Liquid Mass Fraction

FROM 1995 Leaks Document: → EPA Protocol for Equipment Leak Emission Estimates, Nov. 1995.

TABLE 2-3. MARKETING TERMINAL AVERAGE EMISSION FACTORS

Equipment type	Service	Emission factor (kg/hr/source)[a]	lbm/hr/source
Valves	Gas	1.3E-05	
	Light Liquid	4.3E-05	9.5E-5
Pump seals	Gas	6.5E-05	
	Light Liquid	5.4E-04	1.2E-3
Others (compressors and others)[b]	Gas	1.2E-04	
	Light Liquid	1.3E-04	2.9E-4
Fittings (connectors and flanges)[c]	Gas	4.2E-05	
	Light Liquid	8.0E-06	1.8E-5

[a]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane).

[b]The "other" equipment type should be applied for any equipment type other than fittings, pumps, or valves.

[c]"Fittings" were not identified as flanges or non-flanged connectors; therefore, the fitting emissions were estimated by averaging the estimates from the connector and the flange correlation equations.

where lbm = "POUND mass = 2.20462 lbm per kilogram.

$$\left(4.3E-5 \frac{kg}{hr/source}\right)\left(\frac{2.20462\ lbm}{1\ kg}\right) = 9.5 \frac{lb}{hr/source}$$

Sinclair

RECEIVED

JUN 17 1996

DIV. OF ENVIRONMENTAL QUALITY
PERMITS & ENFORCEMENT

June 12, 1996

Mr. Orville D. Green, Assistant Administrator
Permits and Enforcement
Idaho Department of Health and Welfare
Division of Environmental Quality
1410 North Hilton
Boise, Idaho 83706-1255

Re: Sinclair Oil Corporation (Burley) - #9509-138-2
Tier 2 Operating Permit #031-00026
Submittal of Revised Allowable Emissions

Dear Mr. Green:

On May 3, 1996, the Division of Environmental Quality (DEQ) granted Sinclair Oil Corporation (SOC) a hold on the issuance of Tier 2 Operating Permit #031-00026. SOC requested the hold in order to revise the permit's allowable emissions.

Please find attached, the revised forms and text (denoted by revision #1) identifying the requested changes to the Tier 2 Operating Permit Application. Please replace the appropriate portions of the Tier 2 Operating Permit Application initial submittal with these revisions.

These revisions reflect a decrease in the allowable gasoline grade petroleum product which may be distributed through the loading rack (EU #10). In addition, the allowable distillate fuel oil grade petroleum product which may be distributed through the loading rack increased. These changes result in a substantial decrease in the facility-wide allowable emissions. Please note that the allowable emissions from Emissions Units 1 through 10 and the allowable fugitive emissions remain unchanged with respect to the Proposed Tier 2 Operating Permit review package dated February 16, 1996.

Should you have any questions regarding the information in this application, please call me at (801) 524-2729.

Respectfully,

SBGreene

Samuel B. Greene P.E.
Corporate Air Quality Engineer

attachments

cc: Kevin Brown w/o/a
Klane Forsgren w/o/a
Mark Peterson w/o/a
David Stice w/o/a
Dave Cole

Table 4.1 Maximum Potential Emissions Summary

EU #	Description	Maximum Potential VOC Emissions (TPY)[1]	Maximum Potential HAP Emissions (TPY)[1]
1	Tank 301	2.26	0.097
2	Tank 304	2.26	0.097
3	Tank 311	2.26	0.097
4	Tank 321	2.26	0.097
5	Tank 302	0.41	0.010
6	Tank 305	0.41	0.010
7	Tank 306	0.41	0.010
8	Transmix Tank	0.21	0.006
9	Prover Tank	0.21	0.006
10	Loading Rack - gasoline	283.2	7.73
	Loading Rack - distillate oil	3.38	0.085
	Fugitive Emissions	1.26	0.209
	TOTAL EMISSIONS	298.5	8.45

1 The allowable emissions from Emissions Units 1 through 10 and the allowable fugitive emissions remain unchanged with respect to Appendix A of the proposed Tier 2 Operating Permit review package dated February 13, 1996

4.2.2 Fixed Roof Tanks (EU # 5, 6 and 7):

Distillate fuel oil grade petroleum products can be stored in these tanks. Emissions from these units are a result of breathing and working losses as defined per AP-42 methodology. The maximum potential emissions from any one of these tanks occurs when distillate grade petroleum product is loaded, stored and unloaded at the defined maximum throughput. The maximum throughput for any one of these tanks is defined as the capacity of the pipeline supplying the terminal distributed to two of the three storage tanks (this assumes that one of the three storage

Table 4.2 Maximum Annual Product Throughput Limits

EU #	Description	Maximum EU Throughput (gpy)
1	Tank 301	86,359,000
2	Tank 304	86,359,000
3	Tank 311	86,359,000
4	Tank 321	86,359,000
5	Tank 302	155,599,500
6	Tank 305	155,599,500
7	Tank 306	155,599,500
8	Transmix Tank	38,080
9	Prover Tank	220,200
10	Loading Rack - gasoline	107,310,000
	Loading Rack - distillate oil	462,966,000

4.4.1 Storage Tank Monitoring (EU # 1 through 8)

The operator will record the quantity of product received in all storage tanks. This information will be compiled on an annual basis to determine annual product throughput. Periods of excess emissions will be defined as any calendar year (January 1 to December 31) in which the annual throughput of the individual storage tank exceeds the limits indicated in Table 4.2.

4.4.2 Prover (EU # 9)

The operator will compile, on an annual basis, the volume of product transferred to the prover. This information is proportional to the number of flowmeter calibration cycles during the year. Periods of excess emissions will be defined as any calendar year (January 1 to December 31) in which the annual throughput of the prover tank exceeds the limit indicated in Table 5.2.

APPENDIX: D PROPOSED PERMIT CONDITIONS

1. The facility shall be limited to a maximum annual product throughput rate as listed in Table D.1:

Table D.1: Maximum Annual Product Throughput Limits

EU #	Description	Maximum EU Throughput (gpy)
1	Tank 301	86,359,000
2	Tank 304	86,359,000
3	Tank 311	86,359,000
4	Tank 321	86,359,000
5	Tank 302	155,599,500
6	Tank 305	155,599,500
7	Tank 306	155,599,500
8	Transmix Tank	38,080
9	Prover Tank	220,200
10	Loading Rack - gasoline	107,310,000
	Loading Rack - distillate oil	462,966,000

2. Compliance with the permitted maximum potential emissions limit will be based upon monitoring the annual product throughput of each EU. Reporting of the annual EU product throughput will be combined with the registration of emissions and payment of fees for Tier 1 permits (re: IDAPA 16.01.01 Section 525).

3. A period of excess emissions is defined to be any calendar year (January 1 to December 31) in which the annual throughput of the individual EU exceeds the limit indicated in Table D.1.

COMPANY & DIVISION NAME	Sinclair Oil Corporation / Burley Products Terminal Revision 1, June 16, 1996
T ADDRESS OR P.O. BOX	425 east Hwy 81
CITY	Burley
STATE	Idaho
ZIP	83318
PERSON TO CONTACT	Facility Contact : Dave Cole | Permitting Contact : Samuel B Greene
TITLE	Terminal Manager | Corp. Air Quality Engineer
PHONE NUMBER	(208)678-7363 | (801)524-2729
EXACT PLANT LOCATION	T-10, S-36, R-23E
GENERAL NATURE OF BUSINESS	Petroleum Products Storage and Distribution
NUMBER OF FULL-TIME EMPLOYEES	1.5
PROPERTY AREA (ACRES)	15.26

REASON FOR APPLICATION: 6

(1) Permit to Construct a new facility;
(2) Permit to Modify an existing source;
(3) Permit to Construct a new source at an existing facility;
(4) Change of Owner or Location;
(5) Tier I Permit to Operate;
(6) Tier II Permit to Operate

DISTANCE TO NEAREST STATE BORDER (MILES)	50
PRIMARY SIC	5171
SECONDARY SIC	
PLANT LOCATION COUNTY	Cassia
ELEVATION (FT)	4180
NE	12
UTM (X) COORDINATE (KM)	277123
UTM (Y) COORDINATE (KM)	4710315

NAME OF FACILITIES — LOCATION OF OTHER FACILITIES

List all facilities within the state that are under your control, or under common control, and have emissions to the air. If none, so state

Name of Facilities	Location of Other Facilities
Burley Products Terminal	425 east Hwy 81 Burley Idaho 83318 Cassia County
Boise Products Terminal	712 North Curtis Boise Idaho 83706 Ada County

OWNER OR RESPONSIBLE OFFICIAL	Mark Peterson
TITLE OF RESPONSIBLE OFFICIAL	Manager, Pipeline and Terminals

Based on information and belief formed after reasonable inquiry, I certify the statements and information in this document are true, accurate, and complete.

SIGNATURE OF OWNER OR RESPONSIBLE OFFICIAL: [signature]

DATE: [illegible]

DEQ USE ONLY

DEQ PLANT ID CODE		DEQ PROCESS CODE		DEQ STACK ID CODE	
BUILDING ID CODE		PRIMARY SCC		SECONDARY SCC	
DEQ SEGMENT CODE					

PART A: LOADING RACK DATA

PROCESS CODE OR DESCRIPTION	GASOLINE LOADING Revision △, June 12, 1996
STACK DESCRIPTION	EU # 10
BUILDING DESCRIPTION	
DATE INSTALLED OR LAST MODIFIED	1950*
TYPE OF LOADING	5,6

TYPE OF LOADING
Please choose from the following:
(01) Overhead loading - splash fill, normal service;
(02) Overhead loading - splash fill, balanced serviced;
(03) Overhead loading - submerged fill, normal service;
(04) Overhead loading - submerged fill, balanced service;
(05) Bottom loading - normal service;
(06) Bottom loading - balanced service

LOADING ARM VAPOR CLOSURE: 6
Please choose from the following:
(01) incineration;
(02) GREENWOOD;
(03) SOCO;
(04) CHICKSAN;
(05) None - open to air;
(06) Other: Dry brake coupler

MATERIAL LOADED	GASOLINE	
ANNUAL THROUGHPUT (GAL)	107.3E6	(maximum) △
REID VAPOR PRESSURE (PSI)	annual average=10	(15 maximum)
MAXIMUM MATERIAL TEMPERATURE (DEG. F)	59	(annual average maximum)
AVERAGE MATERIAL TEMPERATURE (DEG. F)	47	(daily average)

* See section 5.1.1 of Tier 1 operating permit Application

Revision 1, June 12, 1996

DEC-FEB	25	HOURS/DAY	24
MAR-MAY	25	DAYS/WEEK	7
JUN-AUG	25	WEEKS/YEAR	52
SEP-NOV	25		

POLLUTION CONTROL EQUIPMENT

PARAMETER	PRIMARY	SECONDARY
TYPE	N/A	N/A
TYPE CODE (FROM APP. A)		
MANUFACTURER		
MODEL NUMBER		
PRESSURE DROP (IN. OF WATER)		
WET SCRUBBER FLOW (GPM)		
BAGHOUSE AIR/CLOTH RATIO (FPM)		

VENTILATION AND BUILDING/AREA DATA

ENCLOSED? (Y/N)	N/A
HOOD TYPE (FROM APP. B)	
MINIMUM FLOW (ACFM)	
PERCENT CAPTURE EFFICIENCY	
BUILDING HEIGHT (FT)	
BUILDING LENGTH (FT)	
BUILDING WIDTH (FT)	

STACK DATA

GROUND ELEVATION (FT)	4168
UTM X COORDINATE (KM)	277125
UTM Y COORDINATE (KM)	4710315
STACK TYPE (SEE NOTE BELOW)	3
STACK EXIT HEIGHT FROM GROUND LEVEL (FT)	6
STACK EXIT DIAMETER (FT)	0.3
STACK EXIT GAS FLOWRATE (ACFM)	145
STACK EXIT TEMPERATURE (DEG. F)	47 (ANNUAL AVERAGE)

AIR POLLUTANT EMISSIONS

POLLUTANT	CAS NUMBER	EMISSION FACTOR (SEE NOTE BELOW)	PERCENT CONTROL EFFICIENCY	ESTIMATED OR MEASURED EMISSIONS (LBS/HR)	ALLOWABLE EMISSIONS (LBS/HR)	ALLOWABLE EMISSIONS (TONS/YR)	REFERENCE
PM							
PM-10							
SO2							
CO							
NOx							
VOC		5.28E-03 LB/GAL	0		64.7	283.2	AP-42
LEAD							
Benzene	71-43-2		0		0.35	1.53	AP-42
Hexane	110-54-3		0		0.56	2.46	AP-42
Xylenes	1330-20-7		0		0.19	0.82	AP-42
Toluene	108-88-3		0		0.49	2.15	AP-42
Ethylbenzene	100-41-4		0		0.032	0.14	AP-42
Naphthalene	91-20-3		0		4.6E-5	2.0E-4	AP-42
Trimethylpentane	540-84-1		0		0.14	0.62	AP-42

NOTES: STACK TYPE - 01) DOWNWARD; 02) VERTICAL (UNCOVERED); 03) VERTICAL (COVERED); 04) HORIZONTAL; 05) FUGITIVE

EMISSION FACTOR - IN LBS/UNITS. PLEASE USE SAME HOURLY UNITS GIVEN IN FUEL DATA SECTION.

DEQ USE ONLY

DEQ PLANT ID CODE		DEQ PROCESS CODE		DEQ STACK ID CODE	
BUILDING ID CODE		PRIMARY SCC		SECONDARY SCC	
DEQ SEGMENT CODE					

PART A: LOADING RACK DATA

PROCESS CODE OR DESCRIPTION: DISTILLATE FUEL OIL LOADING Revision △, June 12, 1996

STACK DESCRIPTION: EU #10

BUILDING DESCRIPTION:

DATE INSTALLED OR LAST MODIFIED: 1950*

TYPE OF LOADING: 5,6

Please choose from the following:
(01) Overhead loading - splash fill, normal service;
(02) Overhead loading - splash fill, balanced serviced;
(03) Overhead loading - submerged fill, normal service;
(04) Overhead loading - submerged fill, balanced service;
(05) Bottom loading - normal service;
(06) Bottom loading - balanced service

LOADING ARM VAPOR CLOSURE: 6

Please choose from the following:
(01) Incineration;
(02) GREENWOOD;
(03) SOCO;
(04) CHICKSAN;
(05) None - open to air;
(06) Other: Dry brake coupler

MATERIAL LOADED: DISTILLATE FUEL OIL

ANNUAL THROUGHPUT (GAL.): 463.0E 6 maximum △

REID VAPOR PRESSURE (PSI): .0022 (annual average) (.05 maximum)

MAXIMUM MATERIAL TEMPERATURE (DEG. F): 59 (annual average maximum)

AVERAGE MATERIAL TEMPERATURE (DEG. F): 47 (daily average)

* See section 5.1.1 of Tier 1 Operating Permit Application

Revision △, June 12, 1996

PERCENT FUEL CONSUMPTION PER QUARTER

DEC-FEB	25
MAR-MAY	25
[illegible]	25
[illegible]	25

OPERATING SCHEDULE

HOURS/DAY	24
DAYS/WEEK	7
WEEKS/YEAR	52

POLLUTION CONTROL EQUIPMENT

PARAMETER	PRIMARY	SECONDARY
TYPE	N/A	N/A
TYPE CODE (FROM APP. A)		
MANUFACTURER		
MODEL NUMBER		
PRESSURE DROP (IN. OF WATER)		
WET SCRUBBER FLOW (GPM)		
BAGHOUSE AIR/CLOTH RATIO (FPM)		

VENTILATION AND BUILDING/AREA DATA

ENCLOSED? (Y/N)	N/A
HOOD TYPE (FROM APP. B)	
MINIMUM FLOW (ACFM)	
PERCENT CAPTURE EFFICIENCY	
BUILDING HEIGHT (FT)	
BUILDING LENGTH (FT)	
BUILDING WIDTH (FT)	

STACK DATA

GROUND ELEVATION (FT)	4148
UTM X COORDINATE (KM)	277123
UTM Y COORDINATE (KM)	4718315
STACK TYPE (SEE NOTE BELOW)	3
STACK EXIT HEIGHT FROM GROUND LEVEL (FT)	6
STACK EXIT DIAMETER (FT)	0.5
STACK EXIT GAS FLOWRATE (ACFM)	131
STACK EXIT TEMPERATURE (DEG. F)	47 (ANNUAL

AIR POLLUTANT EMISSIONS

POLLUTANT	CAS NUMBER	EMISSION FACTOR (SEE NOTE BELOW)	PERCENT CONTROL EFFICIENCY	ESTIMATED OR MEASURED EMISSIONS (LBS/HR)	ALLOWABLE EMISSIONS (LBS/HR)	(TONS/YR)	REFERENCE
PM							
PM-10							
SO2							
CO							
NOx							
VOC		1.46E-05 lb voc/gal	0		0.77	3.38	AP-42
LEAD							
Xylenes	1330-20-7		0		0.011	0.047	AP-42
Toluene	108-88-3		0		0.008	0.034	AP-42
Naphthalene	91-20-3		0		3.9E-4	1.7E-3	AP-42

NOTES: STACK TYPE - 01) DOWNWARD; 02) VERTICAL (UNCOVERED); 03) VERTICAL (COVERED); 04) HORIZONTAL; 05) FUGITIVE

EMISSION FACTOR - IN LBS/UNITS. PLEASE USE SAME HOURLY UNITS GIVEN IN FUEL DATA SECTION.

Potential Emissions - Loading Rack

Formula: Loading Losses (lb/1000 gal) = (12.46)(S)(P)(M)/T

Where: S = saturation factor
P = True Vapor Pressure (psia)
M = Molecular Weight of Vapor
T = Liquid Temperature (deg. R)

Loading rack emissions - gasoline

Daily Loadout	7000	BPD
Annual Throughput	107310	M gpy
MW	66.481	
Pvap	3.23	psia
Saturation Factor	1	
Temperature	507	deg. R
Emission Factor	5.2773	lb/M gal
Total VOC emission rate	283.15	TPY

	Component	Vapor Mass Fraction	Emission Rate (TPY)	HAP Emission Rate (TPY)
1	Benzene	0.0054	1.5290	1.5290
2	Hexane	0.0087	2.4634	2.4634
3	Xylene-o	0.0006	0.1699	0.1699
4	Xylene-m	0.0013	0.3681	0.3681
5	Xylene-p	0.001	0.2832	0.2832
6	Toluene	0.0076	2.1520	2.1520
7	Ethylbenzene	0.0005	0.1416	0.1416
8	Naphthalene	5.98E-07	0.0002	0.0002
9	Trimethylpentane (2,2,4)	0.0022	0.6229	0.6229
10	Gasoline(RVP10)	0.9727	275.4222	
	TOTAL	1	283.1625	7.7302

Loading rack emissions - fuel oil

Daily Loadout	30200	BPD
Annual Throughput	462966	M gpy
MW	129.037	
Pvap	0.0048	psia
Saturation Factor	1	
Temperature	507	deg. R
Emission Factor	0.0146	lb/M gal
Total VOC emission rate	3.38	TPY

	Component	Vapor Mass Fraction	Emission Rate (TPY)	HAP Emission Rate (TPY)
1	Benzene	0.000000	0.000000	0.000000
2	Xylene-o	0.003100	0.010468	0.010468
3	Xylene-m	0.011600	0.038633	0.038633
4	Xylene-p		0.000000	0.000000
5	Toluene	0.010200	0.034443	0.034443
6	Naphthalene	0.000500	0.001686	0.001686
7	Fuel oil #2	0.974700	3.291336	
	TOTAL	1.000000	3.376766	0.085432

Sinclair

April 29, 1996

Mr. Brian R. Monson, Bureau Chief
Operating Permits Bureau
Idaho Department of Health and Welfare
Division of Environmental Quality
1410 North Hilton
Boise, Idaho 83706-1255

Re: Sinclair Oil Corporation (Burley) - #9509-138-2
Request for Hold: Tier 2 Operating Permit #031-00026

Dear Mr. Monson:

Per our telephone conversation on April 25, 1996, Sinclair Oil Corporation (SOC) is requesting that further work on the Tier 2 Operating Permit for our Burley facility be put on hold. This request will allow SOC to evaluate the requested emissions limit in the permit application. SOC will either revise the requested emissions limit or instruct the Division to proceed with issuance of the Tier 2 Operating Permit as currently drafted.

Please call me at (801) 524-2729 if you would like to discuss this information.

Respectfully,

SBGreene

Samuel B. Greene P.E.
Corporate Air Quality Engineer

cc: K. Forsgren
M. Peterson
D. Stice

Sinclair

RECEIVED

MAR 21 1996

DIV. OF ENVIRONMENTAL QUALITY
PERMITS & ENFORCEMENT

March 20, 1996

Mr. Brian R. Monson, Bureau Chief
Operating Permits Bureau
Idaho Department of Health and Welfare
Division of Environmental Quality
1410 North Hilton
Boise, Idaho 83706-1255

Re: Sinclair Oil Corporation (Burley) - #9509-138-2
Approval of Proposed Tier 2 Operating Permit #031-00026

Dear Mr. Monson:

Sinclair Oil Corporation (SOC) has reviewed the Proposed Tier 2 Operating Permit (Permit) for our Burley facility, which is currently undergoing a public comment period. SOC feels that the proposed Permit accurately reflects the requested operating conditions and limitations presented in the permit application. SOC has identified items in the Permit that may require revision or clarification in order for the Permit and corresponding technical analysis to be technically accurate. These items are included as an attachment to this letter.

Please call me at (801) 524-2729 if you would like to discuss this information.

Respectfully,

SB Greene

Samuel B. Greene P.E.
Corporate Air Quality Engineer

attachments

cc: K. Brown
D. Cole
K. Forsgren
M. Peterson
D. Stice

550 E. SOUTH TEMPLE • P.O. BOX 30825 • SALT LAKE CITY, UTAH 84130-0825
801-524-2700

Attachment A: Comments on Proposed Permit and Technical Analysis

Permit Text

SOC has identified the following administrative corrections to the proposed Permit:

> Page 2 of 10, Section 1.1, Process Description, 3rd sentence should read: "Gasoline is allowed to be stored in four of these tanks..."
>
> Page 4 of 10, Section 1.1, Process Description, 2nd sentence should read: "... where one or more loading rack arms are attached to the carrier." Note that the loading rack is a bottom loading system and not a top loading system.

Fugitive Emissions

The fugitive emission calculation submitted with the Permit application was based upon Refinery Average Emission Factors[1] applied at 8,760 hours per year. Subsequent to Permit application submittal, the protocol document has been revised. The new revision includes Marketing Terminal Average Emission Factors[2] which are directly applicable to fugitive sources in light liquid (ie. gasoline) service. SOC believes these factors more accurately reflect the fugitive emissions from light liquid service at this facility. Inclusion of the new factors significantly reduces the fugitive VOC and HAP emissions from the facility and SOC supports the use of these factors for this application. The Division's technical analysis utilized "Interim" Emissions Factors[3] for light liquid service which correspond closely to the Marketing Terminal Average Emission Factors.

---

1 Protocol for Equipment Leak Emissions Estimates, EPA-453/R-93-026 June 1993, USEPA Emission Standards Division.

2 Protocol for Equipment Leak Emissions Estimates, EPA-453/R-95-017, November 1995, USEPA Emission Standards Division.

3 New Equipment Leak Emissions Factors for Petroleum Refineries, Gasoline Marketing and Oil and Gas Production Operations, February 1995, USEPA.

With regard to emissions from fugitive sources in heavy liquid (ie. fuel oil) service, neither the Interim factors nor the Marketing Terminal Average Emission Factors include corresponding factors for fuel oil service. The Division utilized "light oil" from Average Emission Factors for Oil and Gas Production Operations[4] for the fuel oil emission factors. SOC is concerned with the use of the "Oil and Gas Production" factors for fuel oil service because these factors result in a higher emissions (lb/hr/source) than the corresponding gasoline service factors.

Fugitive emissions from gasoline service tend to be greater than fugitive emissions from fuel oil service. SOC also recognizes that more accurate factors may not yet be developed for the fuel oil service application. Although the fuel oil service factors used in the technical analysis overpredict fugitive fuel oil emissions, thus providing a conservative estimate of these emissions, SOC agrees with the Division's assessment of fugitive emissions from fuel oil service.

[4] New Equipment Leak Emissions Factors for Oil and Gas Production Operations, August 1995, USEPA.

February 16, 1996

MEMORANDUM

TO: Brian R. Monson, Chief
Operating Permits Bureau
Permits and Enforcement

FROM: Darrin A. Mehr, Air Quality Engineer
Operating Permits Bureau
Wade C. Woolery, Air Quality Engineer
Technical Services Bureau

THROUGH: Susan J. Richards, Air Quality Permits Manager
Operating Permits Bureau

SUBJECT: Technical Analysis for Proposed Tier II Operating Permit (~~#001-00112~~) 031-00026
Sinclair Oil Corporation (Burley)

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 of the Rules for the Control of Air Pollution in Idaho (Rules) for issuing Operating Permits.

FACILITY DESCRIPTION

Sinclair Oil Corporation's (Sinclair) Burley, Idaho, facility distributes petroleum products received through the Chevron supply pipeline originating in Salt Lake City, Utah. Petroleum products consisting of various grades of gasoline and distillate fuel oil are temporarily stored in tanks prior to transfer to mobile carrier tanks for transport and delivery off-site.

PROJECT DESCRIPTION

This project is for the development of an Operating Permit that will create state and federally enforceable limitations on the facility's potential to emit hazardous air pollutants (HAPs). This permit would make the Burley facility a synthetic minor for HAP emissions, which allows the facility to be recognized as an "area source" for HAPs. Bulk gasoline distributors that are recognized as area sources of HAPs avoid the stringent control technology installation requirements of the Bulk Gasoline Distribution MACT standards.

The Operating Permit will address the following existing point and fugitive emission sources:

Gasoline Storage Tanks

The following tanks are used to store gasoline grade petroleum product. Less volatile distillate fuel oil may be stored in these tanks, which results in lesser emissions in comparison to storage of gasoline, and thus, does not increase the facility's potential to emit volatile organic compounds (VOCs) or HAPs.

TANK IDENTIFICATION #	STORAGE CAPACITY (gallons)
301	838,437
304	838,437
311	838,437
321	838,437

Distillate Fuel Oil Storage Tanks

The following tanks are used to store distillate fuel oil grade petroleum products:

TANK IDENTIFICATION #	STORAGE CAPACITY (gallons)
302	825,024
305	825,024
306	825,024

The following two tanks can be considered as "process" tanks. The Prover Tank is used to verify the quantities of petroleum product being transferred to carrier tanks for off-site transport and delivery. The "Trans-Mix" Tank is used to store waste petroleum products (off specification fuels, residual product from other tanks, etc.).

TANK IDENTIFICATION #	STORAGE CAPACITY (gallons)
Prover, #300	734
Trans-Mix	3,808

The facility is equipped with a double bay loading rack. The loading rack system is a submerged pipe design where one or more loading arms of the loading rack system is/are placed in the access hatches in the top of the carrier tank positioned in either loading bay. The submerged fill design reduces loading emissions by decreasing turbulence in the liquid during the transfer process. No additional emissions control equipment is employed.

DOUBLE BAY LOADING RACK	MAXIMUM DAILY THROUGHPUT (gallons/day)
Gasoline Service	709,800
Distillate Fuel Oil Service	852,600

The following equipment is identified as fugitive emissions sources for VOCs and HAPs:

SOURCE	NUMBER OF SOURCES IDENTIFIED
Gasoline Service Pump Seals	6
Valves	99
Flanges	212
Process Drains	2
Oil/Water Separators	0.00
Distillate Fuel Oil Service Pump Seals	3
Valves	76
Flanges	158
Process Drains	0.00
Oil/Water Separators	0.00

Specific details about the process description can be found in the application materials provided by the Sinclair Oil Corporation.

SUMMARY OF EVENTS

On September 12, 1995, the Division of Environmental Quality (DEQ) received an application for a Tier II Operating Permit. This application was declared administratively complete on October 12, 1995. Additional information was received on November 29, 1995, and on January 10, 1996.

The required public comment period is scheduled to start on or around February 23, 1996 and will end on or around March 23, 1996. If the public comment period is scheduled to end on March 23rd (a Saturday), public comment will be accepted until Monday, March 25, 1996.

DISCUSSION

1. Emission Estimates

Emission estimates were originally provided by Sinclair in the September 12, 1995 submittal. Additional supporting calculations and documentation were included in the November 29, 1995, and January 10, 1996, submittals.

The intent of this Tier II permit application is to establish enforceable emission limits for HAPs below the 10/25 ton per year (T/yr) thresholds for single/aggregated HAPs. The facility would be a major source regardless, as the facility's actual annual VOC emissions exceed the 100 T/yr threshold.

Gasoline Physical Properties Assumptions

There were a number of important Sinclair assumptions that DEQ had to accept in order to use Sinclair's emission estimate methodology. Gasoline service emissions constitute the vast majority of the facility's VOC and HAP emissions. The methodology employed was used to determine permit allowable VOC and HAP emissions. The following three points are the most critical to the permitting analysis (see Attachment A to review a copy of DEQ's emission estimates):

1. Gasoline with a Reid Vapor Pressure of 10 pounds per square inch absolute (psia) is representative of an annual average Reid Vapor Pressure (RVP) for gasoline.

2. Various grades of gasoline (winter blend unleaded regular versus summer blend unleaded premium, etc.) have different individual HAP compositions. The HAP compositions will also vary from refinery to refinery.

3. The HAP emissions associated with the RVP 10 psia case are the worst case emissions with regard to potential to emit.

Gasoline RVP is increased during colder months to allow for easier, more efficient, internal combustion engine starting, warmup, and operation. In warmer summer months, the RVP is decreased to reduce problems with vapor lock during engine operation. Lowering the RVP property in gasoline reduces VOC emissions from the volatile gasoline product. The summer months (May 1 through September 15)are identified as the "ozone season". Fuel volatility--specifically gasoline RVP--is regulated in all states within the U.S. during these months by 40 CFR Part 80. More stringent requirements may be contained in State Implementation Plans for states which have ozone nonattainment areas. VOC emissions are regulated in these areas to control the formation of ozone pollution. Idaho has no areas legally recognized as nonattainment for ozone.

The applicable requirement for the distributors of gasoline fuel for use in spark ignition engines is set by the latest standard available from the American Society of Testing and Materials (ASTM). The most recent specification is ASTM D4814-95a, which sets the maximum allowable RVP by month throughout the calendar year. This requirement is regulated by Section 37-2506, Idaho Code. The resulting average annual RVP (best case) is approximately 10.9 psia (see Attachment B to review the ASTM volatility schedule and the average annual RVP estimation). The worst case allowable RVP is approximately 12.6 psia.

All of the points listed above were considered in the development of a Tier II Operating Permit that would be flexible enough to allow Sinclair to continue daily operations without placing difficult operating requirements in the permit. Without specific information on the actual "worst case" gasoline product's chemical composition, the assumption that the application materials presented a reasonable prediction of the chemical composition was used.

The applicant has stated that there is no truly accurate way for Sinclair to predict the exact HAP concentrations in the gasoline received by the terminal through the supply pipeline. This is because the HAP concentrations vary with differing RVP specifications, as well as with the various refineries producing the gasoline product. At DEQ's request, Sinclair provided a copy of the study used for comparison with the gasoline composition presented in the application (distillate fuel oil HAP composition was based on data from actual analyses).[1]

The Radian study contained four types of gasoline that appeared applicable to this project:

- Winter blend premium;
- Winter blend regular;
- Summer blend premium;
- Summer blend regular.

See Attachment C to review a copy of the comparison of the HAP compositions between the various blends of gasoline and the Sinclair submittal received by DEQ on November 29, 1995. Additional gasoline blend data from other sources is also included. The conclusion drawn from this information is that the study gasolines' liquid state HAP compositions are quite similar to those presented as the application's reference gasoline.

The submitted report, however, does not contain specific information on the RVP of the samples. The allowable range for RVP in gasoline distributed within Idaho is between 9.0 and 15.0 psia. The emission estimates presented in the application are for RVP 10 gasoline throughout the calendar year. Because the goal of this Tier II Operating Permit is to establish synthetic minor HAP emission limits for the facility, the overriding concern should be that HAP emissions are adequately represented, and thus, limited by operating requirements related to the parameters affecting HAP emissions.

The best way to identify the potential emissions of HAPs and VOCs would be to have the detailed composition analysis of gasoline products at or near each of the individual RVP limits. The analysis that was employed to establish the allowable emissions is described below.

Loading Rack System

EPA AP-42 Section 5.2 - Transportation and Marketing of Petroleum Liquids, January, 1995, emission factor methodology was used to estimate VOC emissions for the gasoline loading rack. There is a + or - 30 percent probable error associated with this emission factor. The computer software program TANKS, Version 2.0 (TANKS2), September, 1993, developed by the American Petroleum Institute and EPA, was used to estimate emissions resulting from the loading, storage, and unloading of the petroleum products. TANKS2 provided the vapor fraction of HAPs present at the climatic conditions for Burley, Idaho, based on chemical composition and physical property data. This information was used to estimate the individual HAP, aggregated HAP, and VOC emissions for the loading rack system. Loading rack operation was assumed to occur for 8760 hours per year.

A comparison between HAP emissions resulting from the following cases was performed using individual months over an entire calendar year:

1. A constant RVP of 10 psia throughout the year (as utilized in the application).

2. A monthly variation in RVP that followed the "best case" or lower allowable RVP according to the applicable standard (ASTM D4814-95a).

[1] AB2588 Emissions Estimation Techniques for Petroleum Refineries and Bulk Terminals, July 1989. Radian Corporation.

3. A constant RVP of 11 psia throughout the year.

4. A constant RVP of 13 psia throughout the year.

The goal of this comparison was to identify which case should be used to determine the allowable aggregated and individual HAP emissions for the Tier II Operating Permit. This analysis was performed for Sinclair's Boise, Idaho, facility, and it assumes that the HAP concentrations present in the liquid state are identical for each of the four cases. Please refer to Attachment D of the Boise facility's Technical Memorandum for Tier II OP #001-00112, dated February 13, 1996.

Because the loading rack emissions dominate the facility's total emissions, it was the only emission source analyzed. An important topic to note is that the use of individual month HAP and VOC emissions data predicts a greater amount of annual emissions when compared to the annual method where a single annual average mole fraction for each HAP is used to determine a loading loss factor. The monthly method may be subject to additional rounding error that increased the amount of estimated emissions. This analysis assumes the HAP concentrations present in the liquid state for each of the four cases (see Attachment E of the Technical Analysis for the Sinclair Boise Operations Tier II Operating Permit to review the spreadsheet and TANKS2 results). Therefore, the values for Case 1 will not match the proposed allowable emission limits in the Tier II Operating Permit.

It would seem logical that the greater amount of HAPs would be emitted from a more volatile gasoline since VOC emissions increase as the RVP increases. A summary that includes the two individual HAPs emitted in the greatest amounts, aggregated HAPs, and VOC emissions follows. All other HAPs are predicted to be emitted in lesser quantities, including aggregated meta, ortho, and para xylene isomers (listed in Title III of the Clean Air Act Amendments as Xylenes (isomers and mixtures, CAS #1330207)).

The following table represents the results from comparative analysis of the four (4) different RVP-based calculations, which are outlined above, utilizing data from the Sinclair Boise Operations.

BOISE FACILITY

CASE	VOC Emissions (Ton/yr)	Aggregated HAPS Emissions (Ton/yr)	Single HAP Hexane Emissions (Ton/yr)	Single HAP Toluene Emissions (Ton/yr)
Constant RVP = 10 psia	675.11	19.35	6.09	4.45
Variable RVP = ASTM D4814-95a	712.17	19.24	6.02	4.50
Constant RVP = 11 psia	746.30	19.23	6.05	4.46
Constant RVP = 13 psia	858.53	18.49	5.83	4.24

DEQ's analysis results agree with the information provided by Sinclair in their January 10, 1996, submittal. The HAP emissions for a higher RVP gasoline actually are less than for a lower RVP gasoline due to a smaller proportion of HAPs present in the vapor phase of the more volatile, higher RVP cases.

This analysis also provided the justification to not include a Tier II compliance monitoring requirement for Sinclair to monitor the RVP property of the gasoline received and distributed by the facility. This monitoring requirement would have been included in the permit to document that the RVP of the gasoline did not exceed the 10 psia annual average used to establish the synthetic minor emission limits and the applicable standard according to Section 37-2506, Idaho Code, which establishes the upper RVP limitation by month throughout the entire calendar year.

In the absence of RVP monitoring, the only monitoring and recordkeeping required for Sinclair to establish compliance with the proposed emission limits and throughputs is the tracking of gasoline and distillate fuel oil types and the amounts. The requirement will apply to all storage tanks except for the "trans-mix" tank which handles residual tank product and waste product, such as oil/water mixtures, etc., and will apply to the double bay loading rack system.

The Burley facility's allowable emissions were estimated based on the conclusions drawn for the Boise facility's gasoline RVP analysis.

The constant RVP 10 results for the Burley facility are listed in the following table, and are incoporated as loading rach allowable emissions in the Tier II OP.

BURLEY FACILITY

CASE	VOC Emissions (Ton/yr)	Aggregated HAPS Emissions (Ton/yr)	Single HAP Hexane Emissions (Ton/yr)	Single HAP Toluene Emissions (Ton/yr)
Constant RVP = 10 psia	685.65	18.45	5.95	5.19

Petroleum Product Storage Tanks

The TANKS2 software provided the annual individual HAP, aggregated HAP, and VOC emissions for each of the storage tanks. The specification entered into the program were based on the information provided in the application materials. The results are compiled in Attachment A.

Fugitives

New "interim" AP-42 emission factors. August, 1995, for distillate fuel oil, and February 1996, for gasoline (light liquid) approvable by EPA for use in estimating emissions for VOCs (see Attachment E). The interim fugitive emission factors are available from EPA on the EPA TTN Bulletin Board system. The emission factor for the process drain was taken from AP-42 Table 9.1-2, 10/1980. No oil/water separators were addressed in the application, and therefore, emissions from such a source are not accounted for in the allowable emissions.

The EPA interim emission factors were used because they are the most current emission factors available for pump seals, valves, and flanges. The application's potential to emit/allowable emissions estimates for the fugitive sources appeared to incorporate a 2000 hour per year assumption when backcalculated from emissions and emission factor data. Because the loading rack and storage tank operations were not restricted below 8760 hours per year, the fugitive emissions should reflect the same assumption, unless additional information substantiating a lesser number is received.

The use of EPA's interim emission factors and an increase of approximately 438% (8760 versus 2000 hours per year) resulted in a significant reduction in estimated fugitive VOC and HAP emissions. A 438% increase in fugitive emissions would place this facility's potential to emit aggregated HAPs at greater than 25 tons per year from fugitive emission sources alone.

Emission Estimates Conclusions

The final result of all of the analysis performed is that a level confidence is established due to a potential to emit value that in fact rounds up to 25 tons per year with two significant figures. Allowable throughputs remained as requested in the application, and should allow Sinclair a comfortable degree operational flexibility and expansion above current actual operations. Additional information is included in the attached appendices and the appendices for the Technical Analysis Memorandum for the Tier II Operating Permit for the Sinclair Operations in Boise.

A review of past DEQ permitting, reveals that this analysis is consistent with that performed for Permit to Construct on other gasoline distribution facilities.

Facility allowable annual emissions will be:

POLLUTANT	ALLOWABLE EMISSION (Tons/yr)
Volatile Organic Compounds (VOCs)	693.33
Aggregated Hazardous Air Pollutants (HAPs)	19.09
Individual HAPs: Benzene	3.76
Ethylbenzene	0.37
Hexane	6.04
Naphthalene	0.0046
Toluene	5.41
Trimethylpentane 2,2,4 (Iso-Octane)	1.34
Xylenes (mixture of isomers)	2.21

2. <u>Modeling</u>

No modeling was performed to assess the ambient air quality impacts of this facility.

3. <u>Area Classification</u>

Sinclair's Burley facility is located in Cassia County, which is designated as either in attainment or unclassifiable for all criteria air pollutants.

The facility is located AQCR 64, Zone 11.

4. <u>Facility Classification</u>

The facility is not a designated facility as defined by IDAPA 16.01.01.006.25 of the <u>Rules</u>. (Petroleum storage capacity of the facility is approximately 5.834 million gallons. Designated facility threshold is 12.6 million gallons storage capacity.)

The facility is classified as an A1 source due to permitted VOC emission limits in excess of 100 T/yr. Actual annual VOC emissions also exceed 100 T/yr.

5. <u>Regulatory Review</u>

This operating permit is subject to the following regulatory requirements:

a.	<u>IDAPA 16.01.01.006 & 7</u>	Definitions
b.	<u>IDAPA 16.01.01.401</u>	Tier II Operating Permit
c.	<u>IDAPA 16.01.01.403</u>	Permit Requirements for Tier II Sources
d.	<u>IDAPA 16.01.01.404.01(c)</u>	Opportunity for Public Comment
e.	<u>IDAPA 16.01.01.404.01(c)(v)</u>	Consideration of Comments and Final Action
f.	<u>IDAPA 16.01.01.404.04</u>	Authority to Revise or Renew Operating Permits
g.	<u>IDAPA 16.01.01.405</u>	Obligation to Comply
h.	<u>IDAPA 16.01.01.470</u>	Permit Application Fees for Tier II Permits
i.	<u>IDAPA 16.01.01.650</u>	General Rules for the Control of Fugitive Dust
j.	<u>IDAPA 16.01.01.728</u>	Sulfur Content Limit for Distillate Fuel Oil
k.	<u>Section 37-2506, Idaho Code</u>	Quality Standards for Motor Gasoline and Distillate Fuel Oil-Specifications Set By American Society of Testing and Materials
l.	<u>40 CFR Part 80.27</u>	Controls and Prohibition on Gasoline Volatility

FEES

Fees apply to this facility in accordance with IDAPA 16.01.01.470 of the Rules. The facility is subject to permit application fees for Tier II permits in the amount of five hundred dollars ($500.00). Sinclair has already submitted this payment to DEQ with the application.

Fees in accordance with IDAPA 16.01.01.525 of the Rules for major facilities that meet the potential to emit requirements of IDAPA 16.01.01 .008.14 of the Rules apply to this facility. The amount which Sinclair will have to pay will not be determined until final issuance of the Tier II Operating Permit. The issued Tier II Operating Permit will establish the allowable VOC emissions, and thereby, the amount of registration fees for the facility.

RECOMMENDATIONS

Based on the review of the Tier II Operating Permit application materials and of applicable State of Idaho and federal regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Sinclair Oil Corporation, in Burley, Idaho, be issued a Tier II Operating Permit for the sources that exist at the facility. An opportunity for public comment on the air quality aspects of the proposed permit shall be provided as required by IDAPA 16.01.01.404.01 of the Rules. Staff also recommends that the company be notified of the pollutant registration and registration fee requirements pursuant to IDAPA 16.01.01.525 of the Rules in writing.

ODG\SRM\DAN:jrj...\permit\sinclair\sinclabu.TAM

cc: R. Lupton, SCIRO
Source File
COF

ATTACHMENT A

DEQ Spreadsheet on Facility Emissions (RVP-10)

Title V Engineer: DM
Company Name: Sinclair Oil Corp.
Location: Burley, Idaho
Date Created: January 4, 1996
Today's Date: 01/31/96

BURLEY
~~BOISE~~, IDAHO FACILITY

Calculation of Loading Rack Emissions

ASSUMPTIONS

1. TANKS2.0 provides the monthly average true vapor pressure of the gasoline product AND the molar fraction of HAP constituents in the vapor phase of the gasoline product.

2. Trimethylpentane 2,2,4 is also known as Iso-octane.

3. Discussions with EPA Region X and the resulting discussions between EPA Region X and Research Triangle Park reveal that gasoline emissions of the three Xylene isomers should be aggregated under a heading of Xylene (mixtures).

4. A comparison between the single "annual" and individual monthly runs of emissions from TANKS2.0 to derive vapor phase HAP and VOC percenta revealed that the rounding of values due to significant figures predicts greater emissions for the detailed monthly run.

5. The most vital assumption made with this analysis is that it assumes an identical chemical composition throughout the year. The most accurate method for estimating all emissions would be to have samples of gasoline chemical composition for EACH of the different Reid Vapor Pressure (RVP) categories. RVP is determined by chemical composition physical properties. Therefore, the acceptance of a single gasoline chemical composition is an important assumption for DEQ to accept. The applicant has further stated that this information would be difficult, if not impossible, to deliver because they may receive gasoline product from refineries other than their own corporation's.

ANNUAL AVERAGE VAPOR PHASE HAP FRACTION METHOD:

Notes and concerns:

1. EPA has recently made available revised interim emission factors to estimate fugitive emissions from Marketing terminals. The document is titled New Equipment Leak Emission Factors for Petroleum Refineries, Gasoline Marketing, and Oil & Gas Production Operations, February 1995. These emission factors are presented both for the screening method (where a known concentration of VOCs is emitted) and the "average" emission factor method, which requires no monitoring data). The "average" emission factor method is to be used just as in the applicant's submittal. These 1995 emission factors will replace the applicant's emission estimates that employed EPA AP-42 emission factors published in 1980.

2. EPA AP-42 Section 5.2 - Transportation and Marketing of Petroleum Products, January, 1995. This relationship was used to estimate annual VOC and HAP loading rack emissions. The document states that it has within a + or - 30 percent probable error.

ATTACHMENT B

ASTMD 4814-95a Standard Specification and Average Annual Allowable RVP Requirement

TABLE 4 Schedule of Seasonal and Geographical Volatility Classes[A]

This schedule, subject to agreement between purchaser and seller, denotes the volatility properties of the fuel at the time and place of delivery to the end user. It also denotes the vapor pressure for finished gasoline tankage at refineries, importers, pipelines, and terminals during May and for the entire distribution system for June 1 to Sept. 15. Shipments should anticipate this schedule.

Where alternative classes are listed, either class or intermediate classes are acceptable; the option shall be exercised by the seller.

State	Jan.	Feb.	Mar.	Apr.	May[D]	June	July	Aug.	Sept. 1–15	Sept. 16–30	Oct.	Nov.	Dec.
Alabama	D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-2[E]	A-2[E]	A-2/C-3	C-3	C-3/D-4	D-4
Alaska	E-5	E-5	E-5	E-5	E-5/D-4	D-4	D-4	D-4	D-4	D-4/E-5	E-5	E-5	E-5
Arizona													
N 34° Latitude and E 111° Longitude	D-4	D-4	D-4/C-3	C-3/A-2	A-2 (B-2)	A-1	A-1	A-1	A-2	A-2/B-2	B-2/C-3	C-3/D-4	D-4
Remainder of State	D-4	D-4/C-3	C-3/B-2	B-2/A-2	A-2 (B-2)	A-1[E]	A-1[E]	A-1[E]	A-1[E]	A-1	A-1/B-2	B-2/C-3	C-3/D-4
Arkansas	E-5/D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-3	A-2	A-2	A-2	A-2/C-3	C-3/D-4	D-4	D-4/E-5
[B] California:													
North Coast	E-5/D-4	D-4	D-4	D-4/A-3	A-3 (C-3)	A-3[F]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
South Coast	D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-2[E]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4
Southeast	D-4	D-4/C-3	C-3/B-2	B-2/A-2	A-2 (B-2)	A-1[E]	A-1[E]	A-1[E]	A-1[E]	A-1	A-1/B-2	B-2/C-3	C-3/D-4
Interior	E-5/D-4	D-4	D-4	D-4/A-3	A-3 (C-3)	A-2[E]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Colorado	E-5	E-5/D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-2[E]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Connecticut	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
Delaware	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4/E-5	E-5
District of Columbia	E-5	E-5/D-4	D-4	D-4/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-3[F]	A-3[F]	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Florida	D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-3[F]	A-3[F]	A-3/C-3	C-3	C-3/D-4	D-4
Georgia	D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-2[E]	A-2[E]	A-2/C-3	C-3	C-3/D-4	D-4
Hawaii	C-3	C-3	C-3	C-3	C-3	C-3	C-3	C-3	C-3	C-3	C-3	C-3	C-3
Idaho[C]													
N 46° Latitude	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-2	A-2	A-2	A-2	A-2/C-3	C-3/D-4	D-4/E-5	E-5
S 46° Latitude	E-5	E-5/D-4	D-4	D-4/A-3	A-3 (C-3)	A-2	A-2	A-2	A-2	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Illinois:													
N 40° Latitude	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4/E-5	E-5
S 40° Latitude	E-5	E-5	E-5/D-4	D-4/A-3	A-3 (C-3)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4	D-4/E-5
Indiana	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Iowa	E-5	E-5	E-5/D-4	D-4/A-3	A-3 (C-3)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Kansas	E-5	E-5/D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-2[E]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Kentucky	E-5	E-5/D-4	D-4	D-4/A-3	A-3 (C-3)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Louisiana	D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-2[E]	A-2[E]	A-2/C-3	C-3	C-3/D-4	D-4
Maine	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
Maryland	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3[F]	A-3[F]	A-3[F]	A-3[F]	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Massachusetts	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
Michigan	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
Minnesota	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Mississippi	D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-3	A-3	A-2	A-2	A-2/C-3	C-3	C-3/D-4	D-4
Missouri	E-5	E-5/D-4	D-4	D-4/A-3	A-3 (C-3)	A-3[F]	A-2[E]	A-2[E]	A-2[E]	A-2/C-3	C-3/D-4	D-4	D-4/E-5
Montana	E-5	E-5	E-5/D-4	D-4/A-3	A-3 (C-3)	A-2	A-2	A-2	A-2	A-2/C-3	C-3/D-4	D-4/E-5	E-5
Nebraska	E-5	E-5	E-5/D-4	D-4/A-3	A-3 (C-3)	A-2	A-2	A-2	A-2	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Nevada:													
N 38° Latitude	E-5	E-5/D-4	D-4	D-4/A-3	A-3 (C-3)	A-2[E]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
S 38° Latitude	D-4	D-4/C-3	C-3/B-2	B-2/A-2	A-2 (B-2)	A-1	A-1	A-1	A-1	A-1	A-1/B-2	B-2/C-3	C-3/D-4
New Hampshire	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
New Jersey	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
New Mexico:													
N 34° Latitude	E-5/D-4	D-4	D-4/C-3	C-3/A-2	A-2 (B-2)	A-1	A-1	A-2	A-2	A-2/B-2	B-2/C-3	C-3/D-4	D-4
S 34° Latitude	D-4	D-4/C-3	C-3/B-2	B-2/A-2	A-2 (B-2)	A-1	A-1	A-1	A-1	A-1/B-2	B-2/C-3	C-3/D-4	D-4
New York	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
North Carolina	E-5/D-4	D-4	D-4	D-4/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-2[E]	A-2[E]	A-2/C-3	C-3/D-4	D-4	D-4/E-5
North Dakota	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-2	A-2	A-2	A-2/C-3	C-3/D-4	D-4/E-5	E-5
Ohio	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Oklahoma	E-5/D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-2	A-2	A-2	A-2	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Oregon:													
E 122° Longitude	E-5	E-5/D-4	D-4	D-4/A-4	A-4 (D-4)	A-3	A-2	A-2	A-2	A-2/C-3	C-3/D-4	D-4	D-4/E-5
W 122° Longitude	E-5	E-5/D-4	D-4	D-4/A-4	A-4 (D-4)	A-3[F]	A-3[F]	A-3[F]	A-3[F]	A-3/C-3	C-3/D-4	D-4/E-5	E-5
Pennsylvania	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
Rhode Island	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
South Carolina	D-4	D-4	D-4	D-4/A-3	A-3 (C-3)	A-3	A-3	A-2	A-2	A-2/C-3	C-3/D-4	D-4	D-4
South Dakota	E-5	E-5	E-5/D-4	D-4/A-3	A-3 (C-3)	A-2	A-2	A-2	A-2	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Tennessee	E-5/D-4	D-4	D-4	D-4/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-2[E]	A-2[E]	A-2/C-3	C-3/D-4	D-4	D-4/E-5
Texas:													
E 99° Longitude	D-4	D-4	D-4/C-3	C-3/A-3	A-3 (C-3)	A-3[F]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4
W 99° Longitude	D-4	D-4/C-3	C-3/B-2	B-2/A-2	A-2 (B-2)	A-1[E]	A-1[E]	A-1[E]	A-1[E]	A-1/B-2	B-2/C-3	C-3/D-4	D-4
Utah	E-5	E-5/D-4	D-4	D-4/A-3	A-3 (C-3)	A-2[E]	A-2[E]	A-2[E]	A-2[E]	A-2/B-2	B-2/C-3	C-3/D-4	D-4/E-5
Vermont	E-5	E-5	E-5/D-4	D-4/A-4	A-4 (D-4)	A-3	A-3	A-3	A-3	A-3/D-4	D-4	D-4/E-5	E-5
Virginia	E-5	E-5/D-4	D-4	D-4/A-3	A-3 (C-3)	A-3[F]	A-3[F]	A-3[F]	A-3[F]	A-3/C-3	C-3/D-4	D-4/E-5	E-5

1995 AMERICAN SOCIETY FOR TESTING AND MATERIALS:

ASTM D 4814-95a Standard Spec. for Automotive Gasoline

SEASONAL VOLATILITY CLASSES.

IDAHO (South 46° Latitude).

							WHERE:	(psi)
JAN	E	15 psi	JUL	A	9.0 psi		A =	9.0
FEB	E/D	15/13.5 psi	AUG	A	9.0		B =	10.0
MAR	D	13.5 psi	SEP 1-15	A	9.0		C =	11.5
APR	D/A	13.5/9.0	SEP 16-30	A/B	9.0/10		D =	13.5
MAY	A	9.0	OCT	B/C	10/11.5		E =	15.0
JUN	A	9.0	NOV	C/D	11.5/13.5			
			DEC	D/E	13.5/15			

BEST CASE ALLOWABLE AVERAGE VOLATILITY:

$$\left[(1\text{ month})(15.0\text{ psi}) + (3\text{ months})(13.5\text{ psi}) + (1\text{ month})(11.5\text{ psi}) + (1\text{ month})(10.0\text{ psi}) + (6\text{ months})(9.0\text{ psi})\right] / 12\text{ months}$$

$$\boxed{\overline{RVP}_{\substack{BEST\\ALLOW.}} = 10.9\text{ psi}}$$

WORST CASE ALLOWABLE ANNUAL AVERAGE VOLATILITY:

$$\left[(2\text{ months})(15.0\text{ psi}) + (3\text{ mo})(13.5\text{ psi}) + (1\text{ mo})(11.5\text{ psi}) + (0.5\text{ mo})(10.0\text{ psi}) + (5.5\text{ mo})(9.0\text{ psi})\right] / 12\text{ months}$$

$$\boxed{\overline{RVP}_{\substack{WORST\\ALLOW}} = 12.6\text{ psi}}$$

Note: This information for May 1 to September 15 of each calendar year is the same requirement as required by 40CFR80.27.

40CFR 80.27 is an applicable standard for gas Distribution Terminals from May 1 to Sept. 15.

ATTACHMENT C

Spreadsheet on Radian Corporation Gasoline Study and Other Gasoline Composition Data

Sinclair Oil Corporation Boise and Burley Tier II's **RADIAN STUDY ON GASOLINE COMPOSITION**

	HAPs present in UNLEADED gasoline (Oliver and Peoples, 1985 Study) (WEIGHT %)								
Gasoline Constituents:	Benzene	Ethylbenze	Hexane	Isooctane	Naphthalen	Toluene	Xylene(-m)	Xylene(-o)	Xylene(-p)
Summer Regular	1.93	2.05	1.95	3.01	0	10.32	4.58	3.39	4.58
Summer Premium	2.15	2.1	1.23	6.8	0	14.22	4.72	3.69	4.72
Winter Regular	1.82	2.08	1.66	0	0.25	9.11	4.375	3.59	4.375
Winter Premium	2.07	2.14	1.14	0	0.21	12.92	4.8	3.66	4.8

Summer Blends Average	2.04	2.075	1.59	4.905	0	12.27	4.65	3.54	4.65
Winter Blends Average	1.945	2.11	1.4	0	0.23	11.015	4.5875	3.625	4.5875
% Change in HAP concent. (winter with summer as base)	-4.66	1.69	-11.95	-100.00	ERR	-10.23	-1.34	2.40	-1.34
Regular Average	1.875	2.065	1.805	1.505	0.125	9.715	4.4775	3.49	4.4775
Premium Average	2.11	2.12	1.185	3.4	0.105	13.57	4.76	3.675	4.76
Total Average Value	1.99	2.09	1.50	2.45	0.12	11.64	4.62	3.58	4.62

Unincluded HAP from Study

Cumene (Isopropylbenzene)	
Summer Regular	0.19
Summer Premium	0.17
Winter Regular	0.25
Winter Premium	0.19
Total Average Value	0.2

gasoline.wk1

ANNUAL LOADING RACK EMISSIONS using an ANNUAL AVERAGE MOLE FRACTION

GASOLINE SERVICE

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal | L_L = see Chart
S = saturation factor, dimensionless, 1.0 | S = see 1.00
P = true vapor pressure of liquid delivered, psia | P = 3.2269
M = molecular weight of vapor, lb/lb-mole | M = 66.47
T = absolute bulk liquid temperature, °R | T = 506.6

ANNUAL Gasoline Throughput, gallons per year = 259077.0 E^3 gallons

ANNUAL

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/YEAR)
Benzene	0.0054	0.0285	3.69
Ethylbenzene	0.0005	0.0026	0.34
Hexane	0.0087	0.0459	5.95
Naphthalene	0.0000	3.14E-06	4.07E-04
Toluene	0.0076	0.0401	5.19
Trimethylpentane (2,2,4)	0.0019	0.0100	1.30
Xylene-m	0.0013	0.0069	0.89
Xylene-o	0.0006	0.0032	0.41
Xylene-p	0.0010	0.0053	0.68
Gasoline (RVP-10)	0.9730	5.1330	664.92
TOTAL			683.38
TOTAL--HAPS ONLY			18.46

XYLENE (mixture)
1.98 tons per year

DISTILLATE FUEL OIL SERVICE

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal | L_L = see chart below
S = saturation factor, dimensionless, 1.0 | S = see 1.00
P = true vapor pressure of liquid delivered, psia | P = 0.0046
M = molecular weight of vapor, lb/lb-mole | M = 129.04
T = absolute bulk liquid temperature, °R | T = 506.6

ANNUAL Distillate Fuel Oil Throughput, gallons per year = 311180.0 E^3 gallons

ANNUAL

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/YEAR)
Naphthalene	0.0005	7.30E-06	0.001
Toluene	0.0102	0.0001	0.023
Xylene-m	0.0115	0.0002	0.026
Xylene-o	0.0031	0.0000	0.007
Distillate Fuel Oil #2	0.9747	0.0142	2.214
TOTAL	1.0000		2.272
TOTAL--HAPS ONLY			0.057

XYLENE (mixture)
0.03 tons per year

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TYPICAL STORAGE TANK EMISSIONS

Emissions are estimated using TANKS2 and are for a SINGLE ,e tank, except as noted.

Storage tank emissions are comprised of: Withdrawal, roof-fitting, rim-seal, and standing losses.

Gasoline Storage Tanks

Tanks 301, 304, 311, 321

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Benzene	0.0032	0.0141
Ethylbenzene	0.0009	0.0039
Hexane	0.0048	0.0210
Naphthalene	0.0000	0.0002
Toluene	0.0067	0.0293
Trimethylpentane (2,2,4)	0.0014	0.0060
Xylene-m	0.0020	0.0088
Xylene-o	0.0013	0.0059
Xylene-p	0.0019	0.0081
Gasoline (RVP-10)	0.4943	2.1648
TOTAL VOCs	0.516	2.262
TOTAL--HAPS ONLY	0.022	0.097

For the four (4) Tanks:

TOTAL VOCs	2.066	9.048
TOTAL--HAPS ONLY	0.089	0.389

Tanks Transmix and Prover

Emissions are nearly identical (per applicant's submittal) to each other so the Transmix Tank results will be used for both tanks.

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Benzene	0.0003	0.0011
Ethylbenzene	0.0000	0.0001
Hexane	0.0004	0.0018
Naphthalene	0.0000	0.0000
Toluene	0.0004	0.0016
Trimethylpentane (2,2,4)	0.0001	0.0005
Xylene-m	0.0001	0.0003
Xylene-o	0.0000	0.0001
Xylene-p	0.0000	0.0002
Gasoline (RVP-10)	0.0469	0.2053
TOTAL VOCs	0.0482	0.2109
TOTAL--HAPS ONLY	0.0013	0.0056

For the two (2) Tanks:

TOTAL VOCs	0.0963	0.4219
TOTAL--HAPS ONLY	0.0026	0.0112

DISTILLATE FUEL OIL STORAGE TANKS

TANKS 302, 305, 306

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Naphthalene	0.0000	0.0002
Toluene	0.0009	0.0041
Xylene-m	0.0011	0.0047
Xylene-o	0.0003	0.0013
Distillate Fuel Oil #2	0.0909	0.3978
TOTAL VOCs	0.0932	0.4083
TOTAL--HAPS ONLY	0.0024	0.0103

For the three (3) Tanks:

TOTAL VOCs	0.2796	1.2248
TOTAL--HAPS ONLY	0.0071	0.0310

STORAGE TANK SUMMARY

HAPs Compounds	Hourly Emissions (lb/hr)	Annual Emissions (Ton/YEAR)
Benzene	0.0133	0.0584
Ethylbenzene	0.0036	0.0157
Hexane	0.0200	0.0876
Naphthalene	0.0003	0.0013
Toluene	0.0303	0.1326
Trimethylpentane (2,2,4)	0.0057	0.0249
Xylene-m	0.0114	0.0500
Xylene-o	0.0063	0.0275
Xylene-p	0.0075	0.0330
Gasoline OR Fuel Oil	2.3433	10.2639
TOTAL VOCs	2.4417	10.6949
TOTAL--HAPS ONLY	0.0984	0.4310

Xylenes (mixture) 0.1105 Tons/yr

FUGITIVE EMISSIONS

The estimate of fugitive emissions is based on the information provided by the applicant and newly revised "Interim" AP-42 emission factors.

Notes and Comments:

1. Sinclair submittal appears to assume that fugitive emissions occur for 2000 hours per year. If emissions from these sources occur for 8760 hours per year, then the a linear ramping of emissions would predict HAP emissions of > 25 TPY for fugitive sources alone. This would mean that since all point and fugitive HAP emissions must be accounted for in applicability for a major HAP source, that a Tier II synthetic minor option is not an option for Sinclair's facilities. Therefore, this analysis will incorporate the newest AP-42 emission factors available and an assumption of 8760 hours per year. No additional documentation on the 2000 hour/year assumption was listed in the application.

2. The number of emissions sources is provided by the applicant.

SOURCE	# of Sources	Emission Factor lb/hr/source	Total VOC Emissions (lb/hr)	Assumed Hours/yr Operation	Total VOC Emissions (Tons/year)
GASOLINE (light liquid):					
Pump Seals	6	1.2E-03	0.007	8760	0.032
Valves	99	9.5E-05	0.009	8760	0.041
Flanges	212	1.7E-05	0.004	8760	0.016
Process Drains *1	2	0.07	0.140	8760	0.613
Oil/Water Separator	0		0.000	8760	0.000
		Lb/hr totals:	0.160	Ton/yr total	0.702
DISTILLATE FUEL OIL (heavy liquid) *2					
Pump Seals	3	2.9E-02	0.086	8760	0.377
Valves	76	5.5E-05	0.004	8760	0.018
Flanges	158	2.4E-04	0.038	8760	0.168
Process Drains *1	0	0.07	0.000	8760	0.000
Oil/Water Separator	0		0.000	8760	0.000
		Lb/hr totals:	0.128	Ton/yr total	0.563
	Fugitive Grand Total:		0.29 lb/hr		1.26 Ton/yr

*1 Emission factor for the drain is from AP-42 Table 9.1-2 Fugitive Emission Factors for Petroleum Refineries, October/1980

*2 Distillate fuel oil emission factors are from the August 1995 AP-42 Interim Emission Factors for Oil and Gas Production Operations

HAP Emissions = VOC Emission Rate * HAP Liquid Mass Fraction

FUGITIVE HAP EMISSIONS (Gasoline Service)

HAP Component	Liquid Mass Fraction	VOC Emis Rate (lb/hr)	HAP Emission Rate (lb/hr)	VOC emis Rate (Tons/year)	HAP Emission Rate (Tons/year)
Benzene	0.0188	0.0030	0.0030	0.0132	0.0132
Ethylbenzene	0.0207	0.0033	0.0033	0.0145	0.0145
Hexane	0.0181	0.0029	0.0029	0.0127	0.0127
Naphthalene	0.0013	0.0002	0.0002	0.0009	0.0009
Toluene	0.0972	0.0156	0.0156	0.0682	0.0682
Trimethlpentane 2,2,4	0.0151	0.0024	0.0024	0.0106	0.0106
Xylene (-m)	0.0448	0.0072	0.0072	0.0314	0.0314
Xylene (-o)	0.0349	0.0056	0.0056	0.0245	0.0245
Xylene (-p)	0.0448	0.0072	0.0072	0.0314	0.0314
Gasoline (RVP 10)	0.7043	0.1128	0.0000	0.4942	0.0000
Totals:	1.0000	0.1602	0.0474	0.702	0.207

FUGITIVE HAP EMISSIONS (Distillate Fuel Oil Service)

HAP Component	Liquid Mass Fraction	VOC Emis Rate (lb/hr)	HAP Emission Rate (lb/hr)	VOC Emis Rate (Tons/year)	HAP Emission Rate (Tons/year)
Benzene	0.000028	0.000004	0.000004	0.000016	0.000016
Naphthalene	0.001700	0.000218	0.000218	0.000957	0.000957
Toluene	0.000200	0.000026	0.000026	0.000113	0.000113
Xylene (-m)	0.000300	0.000039	0.000039	0.000169	0.000169
Xylene (-o)	0.000600	0.000077	0.000077	0.000338	0.000338
Xylene (-p)	0.000000	0.000000	0.000000	0.000000	0.000000
Distillate Fuel Oil #2	0.997172	0.128121		0.561169	
Totals:	1.0000	0.1285	0.00036	0.5628	0.0016

Emissions and Allowable Throughput Summary - Burley, Idaho Facility

SOURCE IDENTIFICATION	ALLOWABLE EMISSIONS Volatile Organic Compounds (lb/hr)	(Tons/yr)	Aggregated Hazardous Air Pollutants (lb/hr)	(Tons/yr)	ALLOWABLE THROUGHPUT (Gallons/day)	(Gallons/yr)	Allowable Product Type
STORAGE TANKS							
Tank 301	0.52	2.26	0.022	0.097	N/A	86,359,000	Gasoline
Tank 304	0.52	2.26	0.022	0.097	N/A	86,359,000	Gasoline
Tank 311	0.52	2.26	0.022	0.097	N/A	86,359,000	Gasoline
Tank 321	0.52	2.26	0.022	0.097	N/A	86,359,000	Gasoline
	2.07	9.05	0.09	0.39			
Tank 302	0.09	0.41	0.002	0.010	N/A	155,599,500	Distillate Fuel Oil
Tank 305	0.09	0.41	0.002	0.010	N/A	155,599,500	Distillate Fuel Oil
Tank 306	0.09	0.41	0.002	0.010	N/A	155,599,500	Distillate Fuel Oil
	0.28	1.22	0.01	0.03			
Transmix Tank 400	0.05	0.21	0.001	0.006	N/A	38,080	Gasoline
Prover Tank	0.05	0.21	0.001	0.006	N/A	220,200	Gasoline
	0.10	0.42	0.003	0.011			
LOADING RACK							
Gasoline Service	156.02	683.38	4.21	18.45	709,800	259,077,000	Gasoline
Distillate Fuel Oil Service	0.52	2.27	0.00	0.00	852,600	311,199,000	Distillate Fuel Oil
	156.54	685.65	4.21	18.45			
FUGITIVES							
Gasoline Service	0.160	0.702	0.047	0.207	N/A	N/A	
Distillate Fuel Oil Service	0.129	0.563	0.000	0.002	N/A	N/A	
	0.289	1.264	0.048	0.209			
Total Emissions:	159.27	697.61	4.36	19.09			

Notes:

N/A stands for Not Applicable

Annual storage tank emissions are derived from the EPA/API TANKS2.0 program.

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ATTACHMENT D

RVP 11, ASTM D4814-95a Variable RVP, RVP 13
Spreadsheets and TANKS2 Documentation
(Information is for Boise Operations)

TABLE 3
Characteristic Components of Five Petroleum Fuels (Patton & Stevens 1984)

Component	Regular Gasoline (Six Samples) Percent by Weight	Unleaded Gasoline (Three Samples) Percent by Weight	Aviation Gasoline (One Sample) Percent by Weight	Kerosene (Three Samples) Percent by Weight	Diesel No. 2 (Three Samples) Percent by Weight
Benzene	0.47 - 3.6	<0.2 - 3.2	<0.2	<0.2	<0.2
Toluene	3.4 - 10.	4.4 - 12	17	0.23 - 0.44	<0.2
Ethylbenzene	1.5 - 3.1	1.3 - 4.7	0.77	0.16 - 0.33	<0.2
Xylenes	5.4 - 11	7.4 - 16	1.6	0.62 - 1.3	<0.2
n-Propylbenzene	0.64 - 1.0	0.87 - 1.0	<0.2	0.25 - 0.35	<0.2
1,3,5-tri-methylbenzene	1.1 - 1.6	1.3 - 3.9	<0.2	0.51 - 1.0	<0.2
Naphthalene	0.1 - 0.6	0.2 - 0.5	0.006	0.3 - 0.6	0.14 - 0.27
Fluorene	<0.0003 - 0.02	<0.0003 - 0.007	0.0005	0.006 - 0.03	0.07 - 0.10
Phenanthrene	<0.0003 - 0.06	<0.0003 - 0.004	0.0004	0.02 - 0.03	0.25 - 0.30
Anthracene	<0.0001	<0.0001 - 0.0006	0.00002	<0.0001	0.013 - 0.017
Ethylene dibromide	0.015 - 0.02		0.054		
Lead	0.03 - 0.43		0.056		

an arbitrary cut-off. Leseman only reported these components and did not utilize them collectively in any experiment. Major components of the standard reference gasoline PS-6 are also listed in Table 2.

Table 4 presents several different proposals for standard gasoline mixtures. The first is a theoretical mixture utilized by A. Baehr of the U.S. Geological Survey to model selective transport of hydrocarbons in the unsaturated zone (Baehr 1987). His initial composition of a gasoline is based on a packed column gas chromatography analysis of a regular leaded gasoline reported by Bruell and Hoag (1984). With the exception of benzene and toluene, Baehr breaks his theoretical mixture into eight classes or ranges of constituents and performs a weighted average of the physical properties for each group based on weight percentage of constituents within that group. For example, for nine carbon to 11 carbon aromatics, Baehr gives an average molecular

TABLE 4
Surrogate Gasoline Compound Mixtures Proposed in the Past

Baehr 1987 Weight Percent	Selected Constituent Groups (Baehr)	Constituents	Lyman 1988 Weight Percent	Sutton 1988 Weight Percent	Stemenbach 1987 Weight Percent
	C_4 alkanes	Isobutane	2	-	-
		N-butane	1	-	5
25.3	C_5–C_6 alkanes	Isopentane	14	-	10
		N-pentane	3	-	5
		N-hexane	9	-	5
		2-methylpentane	8	15	-
		N-heptane	1.5	-	-
		N-octane	1	-	20
		2,2,4-trimethylpentane	-	15	5
24.2	C_7–C_{11} alkanes	2-methylhexane	5	-	-
		3-methylhexane	-	5	-
		2,4-dimethylhexane	8	-	-
		2,2,4-trimethylhexane	2	-	-
		2,2,5,5-tetramethylhexane	1.5	-	-
	C_{12} aliphatic	C_{12} aliphatic	10	-	-
4.4	C_6 aromatic	Benzene	3	5	2
6.3	C_7 aromatic	Toluene	5	15	20
9.3	C_8 aromatic	Xylenes meta	7	meta 15	(m,p,o)mixture 10
				para 5	
				ortho 10	
		Ethylbenzene	2	5	-
		1,2,4-trimethylbenzene	-	10	8
17.3	C_9–C_{11} aromatic	1,3,5-trimethylbenzene	5	-	-
		1,2-diethylbenzene	5	-	-
7.2	C_5 alkenes	1-pentene	1.5	-	-
1.7	C_6–C_{11} alkenes	1-hexene	1.5	-	-
		2-methyl 2-butane	-	-	5
3.5	C_6 alicyclics	cyclohexane	3	-	5
0.8	C_7–C_{14} alicyclics	methylcyclohexane	1	-	-

Relative BTEX Composition of Gasoline v. #2 Diesel Fuel

	Leaded Gasoline		Unleaded Gasoline		Diesel	
	% Wht	Vol. %	% Wht	Vol %	% Wht	Vol
Benzene	3.6	5	3.2	4.5	<.2	<.3
Toluene	10	14	12	16	<.2	<.3
Ethylbenzene	3.1	4.2	4.7	6.3	<.2	<.3
Xylenes (all)	11	15	16	21.5	<.2	<.3

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Occupational Exposure Limits - Emissions Limits

	OEL	EL	AAL(C)
Benzene	na	8.0E-04	1.2E-01
Toluene	375	25	3.75
Ethylbenzene	435	29	4.35
Xylene	435	29	4.35

Values for benzene are given in ug/m^3, all others in mg/m^3

* CONDENSED CHEMICAL DICTIONARY, UPDATED
GOESSNER G. HAWLEY

APPENDIX I

CHEMICAL COMPOSITION OF GASOLINE

Compound	Number of Carbons	Concentration (Weight Percent) (a)	Reference
Straight Chain Alkanes			
Propane	3	0.01 - 0.14	8,10
n-Butane	4	3.93 - 4.70	8,10,11
n-Pentane	5	5.75 - 10.92	8,10,11
n-Hexane(d)	6	0.24 - 3.50	8,10,11
n-Heptane	7	0.31 - 1.96	10,11
n-Octane	8	0.36 - 1.43	10
n-Nonane	9	0.07 - 0.83	10
n-Decane	10	0.04 - 0.50	10
n-Undecane	11	0.05 - 0.22	10
n-Dodecane	12	0.04 - 0.09	10
Branched Alkanes			
Isobutane	4	0.12 - 0.37	8,10
2,2-Dimethylbutane	6	0.17 - 0.84	10
2,3-Dimethylbutane	6	0.59 - 1.55	8,10,11
2,2,3-Trimethylbutane	7	0.01 - 0.04	10
Neopentane	5	0.02 - 0.05	10
Isopentane	5	6.07 - 10.17	8,10,11
2-Methylpentane	6	2.91 - 3.85	8,10,11
3-Methylpentane	6	2.4 (vol)	8,10,11
2,4-Dimethylpentane	7	0.23 - 1.71	8,10,11
2,3-Dimethylpentane	7	0.32 - 4.17	8,10,11
3,3-Dimethylpentane	7	0.02 - 0.03	10
2,2,3-Trimethylpentane	8	0.09 - 0.23	10,11
2,2,4-Trimethylpentane	8	0.32 - 4.58	8,10
2,3,3-Trimethylpentane	8	0.05 - 2.28	10
2,3,4-Trimethylpentane	8	0.11 - 2.80	10,11
2,4-Dimethyl-3-ethylpentane	9	0.03 - 0.07	10
2-Methylhexane	7	0.36 - 1.48	10
3-Methylhexane	7	0.30 - 1.77	10,11
2,4-Dimethylhexane	8	0.34 - 0.82	10
2,5-Dimethylhexane	8	0.24 - 0.52	10
3,4-Dimethylhexane	8	0.16 - 0.37	10
3-Ethylhexane	8	0.01	10
2-Methyl-3-ethylhexane	9	0.04 - 0.13	10
2,2,4-Trimethylhexane	9	0.11 - 0.18	10

Compound	Number of Carbons	Concentration (Weight Percent) (a)	Reference
2,2,5-Trimethylhexane	9	0.17 - 5.89	10
2,3,3-Trimethylhexane	9	0.05 - 0.12	10
2,3,5-Trimethylhexane	9	0.05 - 1.09	10
2,4,4-Trimethylhexane	9	0.02 - 0.16	10
2-Methylheptane	8	0.48 - 1.05	10
3-Methylheptane	8	0.63 - 1.54	10
4-Methylheptane	8	0.22 - 0.52	10
2,2-Dimethylheptane	9	0.01 - 0.08	10
2,3-Dimethylheptane	9	0.13 - 0.51	10
2,6-Dimethylheptane	9	0.07 - 0.23	10
3,3-Dimethylheptane	9	0.01 - 0.08	10
3,4-Dimethylheptane	9	0.07 - 0.33	10
2,2,4-Trimethylheptane	10	0.12 - 1.70	10
3,3,5-Trimethylheptane	10	0.02 - 0.06	10
3-Ethylheptane	10	0.02 - 0.16	10
2-Methyloctane	9	0.14 - 0.62	10
3-Methyloctane	9	0.34 - 0.85	10
4-Methyloctane	9	0.11 - 0.55	10
2,6-Dimethyloctane	10	0.06 - 0.12	10
2-Methylnonane	10	0.06 - 0.41	10
3-Methylnonane	10	0.06 - 0.32	10
4-Methylnonane	10	0.04 - 0.26	10
Cycloalkanes			
Cyclopentane	5	0.19 - 0.58	8,10
Methylcyclopentane	6	Not quantified	8
1-Methyl-cis-2-ethylcyclopentane	8	0.06 - 0.11	10
1-Methyl-trans-3-ethylcyclopentane	8	0.06 - 0.12	10
1-Cis-2-dimethylcyclopentane	7	0.07 - 0.13	10
1-Trans-2-dimethylcyclopentane	7	0.06 - 0.20	10
1,1,2-trimethylcyclopentane	8	0.06 - 0.11	10
1-Trans-2-cis-3-trimethylcyclopentane	8	0.01 - 0.25	10
1-Trans-2-cis-4-trimethylcyclopentane	8	0.03 - 0.16	10
Ethylcyclopentane	7	0.14 - 0.21	10
n-Propylcyclopentane	8	0.01 - 0.06	10
Isopropylcyclopentane	8	0.01 - 0.02	10
1-Trans-3-dimethylcyclohexane	8	0.05 - 0.12	10
Ethylcyclohexane	8	0.17 - 0.42	10

Compound	Number of Carbons	Concentration (Weight Percent) (a)	Reference
Straight Chain Alkenes			
cis-2-butene	4	0.13 - 0.17	10
trans-2-butene	4	0.16 - 0.20	10
Pentene-1	5	0.33 - 0.45	10
cis-2-pentene	5	0.43 - 0.67	8,10
trans-2-pentene	5	0.52 - 0.90	10,11
cis-2-hexene	6	0.15 - 0.24	10
trans-2-hexene	6	0.18 - 0.36	10
cis-3-hexene	6	0.11 - 0.13	10
trans-3-hexene	6	0.12 - 0.15	10
cis-3-heptene	7	0.14 - 0.17	10,11
trans-2-heptene	7	0.06 - 0.10	10
Branched Alkenes			
2-Methyl-1-butene	5	0.22 - 0.66	8,10,11
3-Methyl-1-butene	5	0.08 - 0.12	10
2-Methyl-2-butene	5	0.96 - 1.28	8,10,11
2,3-Dimethyl-1-butene	6	0.08 - 0.10	10
2-Methyl-1-pentene	6	0.20 - 0.22	10,11
2,3-Dimethyl-1-pentene	7	0.01 - 0.02	10
2,4-Dimethyl-1-pentene	7	0.02 - 0.03	10
4,4-Dimethyl-1-pentene	7	0.6 (vol)	11
2-Methyl-2-pentene	6	0.27 - 0.32	10,11
3-Methyl-cis-2-pentene	6	0.35 - 0.45	10
3-Methyl-trans-2-pentene	6	0.32 - 0.44	10
4-Methyl-cis-2-pentene	6	0.04 - 0.05	10
4-Methyl-trans-2-pentene	6	0.08 - 0.30	10
4,4-Dimethyl-cis-2-pentene	7	0.02 10	
4,4-Dimethyl-trans-2-pentene	7	Not quantified	10
3-Ethyl-2-pentene	7	0.03 - 0.04	10
Cycloalkenes			
Cyclopentene	5	0.12 - 0.18	10
3-Methylcyclopentene	6	0.03 - 0.08	10
Cyclohexene	6	0.03 10	
Alkyl Benzenes			
Benzene(d)	6	0.12 - 3.50	6,7,8,9, 10,11,12

Compound	Number of Carbons	Concentration (Weight Percent) (a)	Reference
Toluene(d)	7	2.73 - 21.80	5,6,7,8, 9,10,11,12
o-Xylene(d)	8	0.68 - 2.86	6,9,10,12
m-Xylene(d)	8	1.77 - 3.87	10
p-Xylene(d)	8	0.77 - 1.58	10
1-Methyl-4-ethylbenzene	9	0.18 - 1.00	10
1-Methyl-2-ethylbenzene	9	0.19 - 0.56	6
1-Methyl-3-ethylbenzene	9	0.31 - 2.86	6,9,10,11
1-Methyl-2-n-propylbenzene	10	0.01 - 0.17	6,9,10
1-Methyl-3-n-propylbenzene	10	0.08 - 0.56	9,10
1-Methyl-3-isopropylbenzene	10	0.01 - 0 12	10
1-Methyl-3-t-butylbenzene	11	0.03 - 0.11	10
1-Methyl-4-t-butylbenzene	11	0.04 - 0.13	10
1,2-Dimethyl-3-ethylbenzene	10	0.02 - 0.19	6,10
1,2-Dimethyl-4-ethylbenzene	10	0.50 - 0.73	6
1,3-Dimethyl-2-ethylbenzene	10	0.21 - 0.59	6,9
1,3-Dimethyl-4-ethylbenzene	10	0.03 - 0.44	6,10
1,3-Dimethyl-5-ethylbenzene	10	0.11 - 0.42	6,10
1,3-Dimethyl-5-t-butylbenzene	12	0.02 - 0.16	10
1,4-Dimethyl-2-ethylbenzene	10	0.05 - 0.36	6,10
1,2,3-Trimethylbenzene	9	0.21 - 0.48	6
1,2,4-Trimethylbenzene	9	0.66 - 3.30	6,9,10,11
1,3,5-Trimethylbenzene	9	0.13 - 1.15	6,9,10
1,2,3,4-Tetramethylbenzene	10	0.02 - 0.19	6,10
1,2,3,5-Tetramethylbenzene	10	0.14 - 1.06	6,9,10
1,2,4,5-Tetramethylbenzene	10	0.05 - 0.67	6,9,10
Ethylbenzene(d)	8	0.36 - 2.86	6,9,10, 11,12
1,2-Diethylbenzene	10	0.57	9
1,3-Diethylbenzene	10	0.05 - 0.38	6,9,10
n-Propylbenzene	9	0.08 - 0.72	6,9,10
Isopropylbenzene	9	<0.01 - 0.23	6,9,10,12
n-Butylbenzene	10	0.04 - 0.44	6,9,10
Isobutylbenzene	10	0.01 - 0.08	9,10
sec-Butylbenzene	10	0.01 - 0.13	9,10
t-Butylbenzene	10	0.12	9
n-Pentylbenzene	11	0.01 - 0.14	10
Isopentylbenzene	11	0.07 - 0.17	10

Compound	Number of Carbons	Concentration (Weight Percent) (a)	Reference
Indan	9	0.25 - 0.34	6
1-Methylindan	10	0.04 - 0.17	10
2-Methylindan	10	0.02 - 0.10	10
4-Methylindan	10	0.01 - 0.16	10
5-Methylyindan	10	0.09 - 0.30	10
Tetralin	10	0.01 - 0.14	10
Polynuclear Aromatic Hydrocarbons			
Naphthalene(d)	10	0.09 - 0.49	6,10
Pyrene	16	Not quantified	6
Benz(a)anthracene	18	Not quantified	6
Benz(a)pyrene	20	0.19 - 2.8 mg/kg	6
Benzo(e)pyrene	20	Not quantified	6
Benzo(g,h,i)perylene	21	Not quantified	6
Elements			
Bromine		80 - 345 µg/g	3
Cadmium		0.01 - 0.07 µg/g	1
Chlorine		80 - 300 µg/g	3
Lead(b)		530 - 1120 µg/g	8
Sodium		<0.6 - 1.4 µg/g	3
Sulfur(c)		0.10 - 0.15	(ASTM)
Vanadium		<0.02 - 0.001 µg/g	2,3
Additives			
Ethylene dibromide(d)		0.7 - 177.2 ppm	4
Ethylene dichloride(d)		150 - 300 ppm	8
Tetramethyl lead			
Tetraethyl lead			

a. Conversion from other units assumed 0.75 specific gravity.

b. ASTM specification, maximum, unleaded gasoline, 0.013 g/l maximum, conventional grade gasoline, 1.1 g/l. Title 13, CAC, Section 2253.: maximum, leaded gasoline other than leaded high octane gasoline, 0.: g/gallon maximum, leaded high octane gasoline, 1.0 g/gallon. Feder standards, January 1, 1986, maximum, 0.1 g/gallon.

c. ASTM maximum, unleaded gasoline, 0.10 weight percent. Conventional grade gasoline, 0.15 weight percent, Title 13, CAC, Section 2252, maximum 300 ppm by weight.

d. Compounds for which AALs are being developed.

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APPENDIX J

CHEMICAL COMPOSITION OF DIESEL FUEL

Compound	Number of Carbons	Concentration (Weight/ Percent)	Reference
Straight Chain Alkanes			
n-Nonane	9	0.1	6,7
n-Decane NIL	10	0.5 - 2	1,2,6,7
n-Undecane NIL	11	0.98 - 9	1,2,6,7
n-Dodecane NIL	12	0.96 - 11	1,2,6,7
n-Tridecane NIL	13	1.1 - 10	1,2,6,7
n-Tetradecane NIL	14	1.1 - 9	1,2,6,7
n-Pentadecane NIL	15	1.0 - 7	1,2,6,7
n-Hexadecane NIL	16	1.2 - 6	1,2,6,7
n-Heptadecane NIL	17	1.2 - 6	1,2,6,7
n-Octadecane NIL	18	0.82 - 5	1,2,6,7
n-Nonadecane NIL	19	0.53 - 4	1,2,6,7
n-Eicosane NIL	20	0.23 - 3	1,2,6,7
n-Heneicosane NIL	21	1	1,2,7
n-Docosane NIL	22	< 0.2	1,2,7
Branched Alkanes			
2-Methylheptadecane	18		7
2,6,10,14-Tetramethyl-pentadecane	19		1
2,6,10,14-Tetramethyl-pentadecane	20		1
Alkyl Benzenes			
Benzene	6		7
Toluene	7		7
o-Xylene	8		7
m-Xylene	8		7
2-Ethyltoluene	9		7
3-Ethyltoluene	9		7
4-Ethyltoluene	9		7
Isopropylbenzene	9		7
1,2,3-Trimethylbenzene	9		7
1,2,4-Trimethylbenzene	9		7
1,3,5-Trimethylbenzene	9		7
1,2,3,5-Tetramethylbenzene	10		7
1,2,4,5-Tetramethylbenzene	10		7
Pentamethylbenzene	11		7
Biphenyl	12		7

Compound	Number of Carbons	Concentration (Weight/ Percent) (a)	Reference
Polynuclear Aromatic Hydrocarbons			
Naphthalene(d)	10	0.13	6,7
Methylnaphthalene	11	0.57 - 0.91	6,7
2,3,5-Trimethylnaphtalene	13		7
Fluorene	13		7
Phenanthrene	14		4
Anthracene	14		4
Pyrene	16		4
Benz(a)pyrene	20	0.07 ug/kg	4,8
Benzo(b)flouranthene	20		4
Benzo(g,h,i)perylene	21		4
Elements			
Barium		0.007 - 0.7 ug/g	3
Cadmium		0.001 - 0.07 ug/g	3
Calcium		0.1 ug/ml	6
Chromium		0.01 - 0.7 ug/g	3
Cobalt		0.007 - 0.1 ug/g	3
Copper		0.01 - 0.3 ug/g	3
Lead		0.1 ug/ml	6
Molybdenum		<0.001 - 0.07 ug/g	3
Nickel		0.007 - 0.1 ug/g	3
Selenium		0.001 - 0.03	3
Vanadium		0.0007 - 0.003 ug/g	3
Zinc		0.01 - 3 ug/g	5

* EXCEEDS TAP LIMIT

Notes

a. Conversion from other units for gasoline assumed 0.75 specific gravity.

b. ASTM specification, max., unleaded gasoline, 0.013 g/l max., conventional grade gasoline, 1.1 g/l, Title 13, CAC, Section 2253.2, max., leaded gasoline other than leaded high octane gasoline, 0.3 g/gal max., leaded high octane gasoline, 1.0 g/gal. Federal standards, January 1, 1986, max., 0.1 g/gal.

c. ASTM max., unleaded gasoline, 0.10 weight percent conventional grade gasoline, 0.15 weight percent, Title 13, CAC, Section 2252, max. 300 ppm by weight.

d. Compounds for which AALs have been or are being developed.

.93 g/ml H.C (N) FUEL OIL) HANDBOOK OF MATHEMATICAL SCIENTIFIC AND ENGINEERING FORMULAS TABLES, FUNCTIONS GRAPHS, TRANSFORMS; PG 79, 1994

Title V Engineer:	DM
Company Name:	Sinclair Oil Corp.
Location:	Boise, Idaho
Date Created:	January 4, 1996
Today's Date:	01/25/96

Calculation of Loading Rack Emissions ***THIS SPREADSHEET IS DESIGNED TO ESTIMATE EMISSIONS BY MONTH***
ENFORCEABLE STANDARD (ASTM D 4814-95a) FOR GASOLINE RVP variance with month

ASSUMPTIONS

1. TANKS2.0 provides the monthly average true vapor pressure of the gasoline product AND the molar fraction of HAP constituents in the vapor phase of the gasoline product.
2. **Gasoline RVP varies as allowed by ASTM D4814-95a Specificiations. HAP constituents remain the same throughout. They only vary with differing ambient conditions, as predicted by the TANKS2.0 program for HAPs present in the vapor phase.**

Reference: AP-42, Sect 5.2
only january is changed below

JANUARY	**JANUARY**	**JANUARY**	
L_L = 12.46 SPM/T	where L_L = loading loss, lb/1000 gal	L_L =	see Chart
	S = saturation factor, dimensionless, 1.0	S = see	1
	P = true vapor pressure, psia	P =	4.5876
	M = molecular weight of vapor, varies lb/lb-mole	M =	61.008
	T = absolute temperature, R	T =	511.1

JANUARY Gasoline Throughput, gallons per month, = 19438.3 E^3 gallons

JANUARY

HAPs Compounds	**Vapor Mass Fraction**	**L_L (lb/10^3 gal)**	**Emissions (Ton/month)**
Benzene	0.0032	0.0218	0.21
Ethylbenzene	0.0003	0.0020	0.02
Hexane	0.0053	0.0362	0.35
Naphthalene	0.0000	4.07E-06	3.95E-05
Toluene	0.0063	0.0430	0.42
Trimethylpentane (2,2,4)	0.0009	0.0061	0.06
Xylene-m	0.0008	0.0055	0.05
Xylene-o	0.0003	0.0020	0.02
Xylene-p	0.0006	0.0041	0.04
Gasoline (RVP-15)	0.9842	6.7151	65.26
TOTAL			66.44
TOTAL--HAPS ONLY			1.17

ASTM D-4814-95a allowable RVPs

FEBRUARY | FEBRUARY | FEBRUARY

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal | L_L = | see Chart
S = saturation factor, dimensionless, 1.0 | S = see | 1
P = true vapor pressure, 4.0 psia | P = | 4.3253
M = molecular weight of vapor, 66.5 lb/lb-mole | M = | 61.859
T = absolute temperature, 508°R | T = | 511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

FEBRUARY

HAPs Compounds	Mole Fraction	L_L (lb/10³ gal)	Emissions (Ton/month)
Benzene	0.0038	0.0248	0.24
Ethylbenzene	0.0003	0.0020	0.02
Hexane	0.0061	0.0398	0.39
Naphthalene	0.0000	3.89E-06	3.78E-05
Toluene	0.0052	0.0339	0.33
Trimethylpentane (2,2,4)	0.0012	0.0078	0.08
Xylene-m	0.0009	0.0059	0.06
Xylene-o	0.0004	0.0026	0.03
Xylene-p	0.0007	0.0046	0.04
Gasoline (RVP-13.5)	0.9814	6.4012	62.21
TOTAL			63.39
TOTAL--HAPS ONLY			1.18

MARCH | MARCH | MARCH

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal | L_L = | see Chart
S = saturation factor, dimensionless, 1.0 | S = see | 1
P = true vapor pressure, 4.0 psia | P = | 4.5869
M = molecular weight of vapor, 66.5 lb/lb-mole | M = | 61.873
T = absolute temperature, 508°R | T = | 511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

MARCH

HAPs Compounds	Mole Fraction	L_L (lb/10³ gal)	Emissions (Ton/month)
Benzene	0.0039	0.0270	0.26
Ethylbenzene	0.0004	0.0028	0.03
Hexane	0.0062	0.0429	0.42
Naphthalene	0.0000	4.12E-06	4.01E-05
Toluene	0.0054	0.0374	0.36
Trimethylpentane (2,2,4)	0.0013	0.0090	0.09
Xylene-m	0.0009	0.0062	0.06
Xylene-o	0.0004	0.0028	0.03
Xylene-p	0.0007	0.0048	0.05
Gasoline (RVP-13.5)	0.9808	6.7857	65.95
TOTAL			67.24
TOTAL--HAPS ONLY			1.29

ASTM D4814-95a allowable RVPs

APRIL APRIL APRIL

L_L = 12.46 SPM/T	where L_L = loading loss, lb/1000 gal	L_L =	see Chart
	S = saturation factor, dimensionless, 1.0	S = see	1
	P = true vapor pressure, 4.0 psia	P =	3.1001
	M = molecular weight of vapor, 66.5 lb/lb-mole	M =	67.049
	T = absolute temperature, 508°R	T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

APRIL

HAPs Compounds	Mole Fraction	L_L (lb/10³ gal)	Emissions (Ton/month)
Benzene	0.0063	0.0319	0.31
Ethylbenzene	0.0006	0.0030	0.03
Hexane	0.0100	0.0507	0.49
Naphthalene	0.0000	3.02E-06	2.94E-05
Toluene	0.0089	0.0451	0.44
Trimethylpentane (2,2,4)	0.0023	0.0117	0.11
Xylene-m	0.0016	0.0081	0.08
Xylene-o	0.0007	0.0035	0.03
Xylene-p	0.0012	0.0061	0.06
Gasoline (RVP-9)	0.9684	4.9070	47.69
TOTAL			49.25
TOTAL--HAPS ONLY			1.56

MAY MAY MAY

L_L = 12.46 SPM/T	where L_L = loading loss, lb/1000 gal	L_L =	see Chart
	S = saturation factor, dimensionless, 1.0	S = see	1
	P = true vapor pressure, psia	P =	3.401
	M = molecular weight of vapor, lb/lb-mole	M =	67.077
	T = absolute temperature, °R	T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

MAY

HAPs Compounds	Mole Fraction	L_L (lb/10³ gal)	Emissions (Ton/month)
Benzene	0.0065	0.0361	0.35
Ethylbenzene	0.0007	0.0039	0.04
Hexane	0.0103	0.0573	0.56
Naphthalene	0.0000	3.31E-06	3.22E-05
Toluene	0.0094	0.0523	0.51
Trimethylpentane (2,2,4)	0.0025	0.0139	0.14
Xylene-m	0.0017	0.0095	0.09
Xylene-o	0.0007	0.0039	0.04
Xylene-p	0.0013	0.0072	0.07
Gasoline (RVP-9)	0.9670	5.3778	52.27
TOTAL			54.06
TOTAL--HAPS ONLY			1.79

JUNE

L_L = 12.46 SPM/T

JUNE

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, 4.0 psia
M = molecular weight of vapor, 66.5 lb/lb-mole
T = absolute temperature, 508°R

JUNE

L_L =	see Chart
S = see	1
P =	3.6857
M =	67.101
T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

JUNE

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0067	0.0404	0.39
Ethylbenzene	0.0007	0.0042	0.04
Hexane	0.0105	0.0633	0.62
Naphthalene	0.0000	3.59E-06	3.49E-05
Toluene	0.0098	0.0591	0.57
Trimethylpentane (2,2,4)	0.0027	0.0163	0.16
Xylene-m	0.0018	0.0109	0.11
Xylene-o	0.0008	0.0048	0.05
Xylene-p	0.0013	0.0078	0.08
Gasoline (RVP-9)	0.9657	5.8222	56.59
TOTAL			58.60
TOTAL--HAPS ONLY			2.01

JULY

L_L = 12.46 SPM/T

JULY

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute temperature, °R

JULY

L_L =	see Chart
S = see	1
P =	3.9976
M =	67.126
T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

JULY

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0069	0.0451	0.44
Ethylbenzene	0.0007	0.0046	0.04
Hexane	0.0108	0.0706	0.69
Naphthalene	0.0000	3.90E-06	3.79E-05
Toluene	0.0102	0.0667	0.65
Trimethylpentane (2,2,4)	0.0029	0.0190	0.18
Xylene-m	0.0019	0.0124	0.12
Xylene-o	0.0008	0.0052	0.05
Xylene-p	0.0014	0.0092	0.09
Gasoline (RVP-9)	0.9644	6.3087	61.32
TOTAL			63.58
TOTAL--HAPS ONLY			2.26

AUGUST	AUGUST	AUGUST		
L_L = 12.46 SPM/T	where L_L = loading loss, lb/1000 gal		L_L =	see Chart
	S = saturation factor, dimensionless, 1.0		S = see	1
	P = true vapor pressure, psia		P =	3.8657
	M = molecular weight of vapor, lb/lb-mole		M =	67.116
	T = absolute temperature, °R		T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

AUGUST

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0068	0.0430	0.42
Ethylbenzene	0.0007	0.0044	0.04
Hexane	0.0107	0.0677	0.66
Naphthalene	0.0000	3.77E-06	3.66E-05
Toluene	0.0101	0.0639	0.62
Trimethylpentane (2,2,4)	0.0028	0.0177	0.17
Xylene-m	0.0018	0.0114	0.11
Xylene-o	0.0008	0.0051	0.05
Xylene-p	0.0014	0.0089	0.09
Gasoline (RVP-9)	0.9650	6.1035	59.32
TOTAL			61.48
TOTAL--HAPS ONLY			2.16

SEPTEMBER	SEPTEMBER	SEPTEMBER		
L_L = 12.46 SPM/T	where L_L = loading loss, lb/1000 gal		L_L =	see Chart
	S = saturation factor, dimensionless, 1.0		S = see	1
	P = true vapor pressure, psia		P =	3.5289
	M = molecular weight of vapor, lb/lb-mole		M =	67.088
	T = absolute temperature, °R		T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

SEPTEMBER

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0066	0.0381	0.37
Ethylbenzene	0.0007	0.0040	0.04
Hexane	0.0104	0.0600	0.58
Naphthalene	0.0000	3.44E-06	3.34E-05
Toluene	0.0096	0.0554	0.54
Trimethylpentane (2,2,4)	0.0026	0.0150	0.15
Xylene-m	0.0017	0.0098	0.10
Xylene-o	0.0007	0.0040	0.04
Xylene-p	0.0013	0.0075	0.07
Gasoline (RVP-9)	0.9664	5.5775	54.21
TOTAL			56.09
TOTAL--HAPS ONLY			1.88

ASTM D4814-95a allowable RVPs

OCTOBER OCTOBER OCTOBER

L_L = 12.46 SPM/T where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, psia

M = molecular weight of vapor, lb/lb-mole

T = absolute temperature, °R

L_L =	see Chart
S = see	1
P =	3.5276
M =	66.498
T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

OCTOBER

HAPs Compounds	Mole Fraction	L_L (lb/10 ; gal)	Emissions (Ton/month)
Benzene	0.0056	0.0320	0.31
Ethylbenzene	0.0005	0.0029	0.03
Hexane	0.0090	0.0515	0.50
Naphthalene	0.0000	3.41E-06	3.31E-05
Toluene	0.0080	0.0457	0.44
Trimethylpentane (2,2,4)	0.0021	0.0120	0.12
Xylene-m	0.0014	0.0080	0.08
Xylene-o	0.0006	0.0034	0.03
Xylene-p	0.0011	0.0063	0.06
Gasoline (RVP-10)	0.9717	5.5567	54.01
TOTAL			55.58
TOTAL--HAPS ONLY			1.57

NOVEMBER NOVEMBER NOVEMBER

L_L = 12.46 SPM/T where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, psia

M = molecular weight of vapor, lb/lb-mole

T = absolute temperature, °R

L_L =	see Chart
S = see	1
P =	3.6717
M =	64.415
T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

NOVEMBER

HAPs Compounds	Mole Fraction	L_L (lb/10 ; gal)	Emissions (Ton/month)
Benzene	0.0046	0.0265	0.26
Ethylbenzene	0.0004	0.0023	0.02
Hexane	0.0074	0.0427	0.41
Naphthalene	0.0000	3.44E-06	3.34E-05
Toluene	0.0064	0.0369	0.36
Trimethylpentane (2,2,4)	0.0015	0.0086	0.08
Xylene-m	0.0011	0.0063	0.06
Xylene-o	0.0005	0.0029	0.03
Xylene-p	0.0008	0.0046	0.04
Gasoline (RVP-11.5)	0.9774	5.6354	54.77
TOTAL			56.04
TOTAL--HAPS ONLY			1.27

ASTM D4814-95a allowable RVPs

DECEMBER DECEMBER DECEMBER

L_L = 12.46 SPM/T where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, 4.0 psia

M = molecular weight of vapor, 66.5 lb/lb-mole

T = absolute temperature, 508°R

L_L =	see Chart
S = see	1
P =	4.123
M =	61.847
T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

DECEMBER

HAPs Compounds	Mole Fraction	L_L (lb/10 3 gal)	Emissions (Ton/month)
Benzene	0.0037	0.0230	0.22
Ethylbenzene	0.0003	0.0019	0.02
Hexane	0.0060	0.0373	0.36
Naphthalene	0.0000	3.70E-06	3.60E-05
Toluene	0.0051	0.0317	0.31
Trimethylpentane (2,2,4)	0.0011	0.0068	0.07
Xylene-m	0.0009	0.0056	0.05
Xylene-o	0.0004	0.0025	0.02
Xylene-p	0.0006	0.0037	0.04
Gasoline (RVP-13.5)	0.9820	6.1043	59.33
TOTAL			60.42
TOTAL--HAPS ONLY			1.09

ANNUAL LOADING RACK EMISSIONS (RVP 10 with Sinclair HAPs)

VOC Emissions (Ton/yr)	Aggreg HAP Emissions (Ton/yr)	Single HAP Hexane Emis (Ton/yr)	Single HAP Toluene (Ton/yr)
712.17	19.24	6.02	4.50

	VOC Emissions (Ton/month)	Aggregate HAPs (Ton/month)	Hexane Emissions (Ton/month)
January	66.44	1.17	0.35
February	63.39	1.18	0.39
March	67.24	1.29	0.42
April	49.25	1.56	0.49
May	54.06	1.79	0.56
June	58.60	2.01	0.62
July	63.58	2.26	0.69
August	61.48	2.16	0.66
September	56.09	1.88	0.58
October	55.58	1.57	0.50
November	56.04	1.27	0.41
December	60.42	1.09	0.36

ASTM D4814-95a allowable RVPs

ASTM D4814-95a allowable RVPs

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	401 season
City:	Boise
State:	ID
Company:	Sinclair Oil
Type of Tank:	External Floating Roof

Tank Dimensions

Diameter (ft):	60
Volume(gallons):	839400
Turnovers:	69

Paint Characteristics

Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Paint Condition:	Good

Roof Characteristics

Roof Type:	Double Deck
Fitting Category:	Typical

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal:	Shoe-mounted

Roof Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10
Roof Drain (3-in. Diameter)/Open	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1

Meteorological Data Used in Emission Calculations: Boise, Idaho

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 9-Sinclair HAPs	APR	52.46	45.90	59.03	51.12	3.1001	N/A	N/A	67.049				
Benzene						0.9440	N/A	N/A		0.0188	0.0063	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0831	N/A	N/A		0.0207	0.0006	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.5673	N/A	N/A		0.0181	0.0100	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.4345	N/A	N/A		0.0151	0.0023	114.22	Option 1
Naphthalene C-10, H-8						0.0017	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2600	N/A	N/A		0.0972	0.0089	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0995	N/A	N/A		0.0448	0.0016	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0539	N/A	N/A		0.0349	0.0007	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0746	N/A	N/A		0.0448	0.0012	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 9)						3.8888	N/A	N/A		0.7043	0.9684	66.50	Option 4: RVP=9.00, ASTM Slope=2.5
Gasoline RVP 9-Sinclair HAPs	MAY	56.94	49.41	64.47	51.12	3.4010	N/A	N/A	67.077				
Benzene						1.0722	N/A	N/A		0.0188	0.0065	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0975	N/A	N/A		0.0207	0.0007	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.7660	N/A	N/A		0.0181	0.0103	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.5209	N/A	N/A		0.0151	0.0025	114.22	Option 1
Naphthalene C-10, H-8						0.0021	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2999	N/A	N/A		0.0972	0.0094	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1165	N/A	N/A		0.0448	0.0017	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0636	N/A	N/A		0.0349	0.0007	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0874	N/A	N/A		0.0448	0.0013	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 9)						4.2618	N/A	N/A		0.7043	0.9670	66.50	Option 4: RVP=9.00, ASTM Slope=2.5
Gasoline RVP 9-Sinclair HAPs	JUN	60.89	52.92	68.86	51.12	3.6857	N/A	N/A	67.101				
Benzene						1.1969	N/A	N/A		0.0188	0.0067	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1119	N/A	N/A		0.0207	0.0007	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.9580	N/A	N/A		0.0181	0.0105	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6006	N/A	N/A		0.0151	0.0027	114.22	Option 1
Naphthalene C-10, H-8						0.0025	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3394	N/A	N/A		0.0972	0.0098	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1334	N/A	N/A		0.0448	0.0018	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0734	N/A	N/A		0.0349	0.0008	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1003	N/A	N/A		0.0448	0.0013	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 9)						4.6142	N/A	N/A		0.7043	0.9657	66.50	Option 4: RVP=9.00, ASTM Slope=2.5
Gasoline RVP 9-Sinclair HAPs	JUL	64.94	56.05	73.82	51.12	3.9976	N/A	N/A	67.126				
Benzene						1.3371	N/A	N/A		0.0188	0.0069	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1286	N/A	N/A		0.0207	0.0007	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						2.1725	N/A	N/A		0.0181	0.0108	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6945	N/A	N/A		0.0151	0.0029	114.22	Option 1

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Naphthalene C-10, H-8						0.0030	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3843	N/A	N/A		0.0972	0.0102	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1530	N/A	N/A		0.0448	0.0019	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0847	N/A	N/A		0.0349	0.0008	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1152	N/A	N/A		0.0448	0.0014	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 9)						4.9999	N/A	N/A		0.7043	0.9644	66.50	Option 4: RVP=9.00, ASTM Slope=2.5
Gasoline RVP 9-Sinclair HAPs	AUG	63.26	55.14	71.38	51.12	3.8657	N/A	N/A	67.116				
Benzene						1.2774	N/A	N/A		0.0188	0.0068	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1215	N/A	N/A		0.0207	0.0007	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						2.0813	N/A	N/A		0.0181	0.0107	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6555	N/A	N/A		0.0151	0.0028	114.22	Option 1
Naphthalene C-10, H-8						0.0028	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3651	N/A	N/A		0.0972	0.0101	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1446	N/A	N/A		0.0448	0.0018	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0798	N/A	N/A		0.0349	0.0008	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1088	N/A	N/A		0.0448	0.0014	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 9)						4.8368	N/A	N/A		0.7043	0.9650	66.50	Option 4: RVP=9.00, ASTM Slope=2.5
Gasoline RVP 9-Sinclair HAPs	SEP	58.75	51.48	66.02	51.12	3.5289	N/A	N/A	67.088				
Benzene						1.1278	N/A	N/A		0.0188	0.0066	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1039	N/A	N/A		0.0207	0.0007	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.8518	N/A	N/A		0.0181	0.0104	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.5558	N/A	N/A		0.0151	0.0026	114.22	Option 1
Naphthalene C-10, H-8						0.0023	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3175	N/A	N/A		0.0972	0.0096	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1240	N/A	N/A		0.0448	0.0017	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0679	N/A	N/A		0.0349	0.0007	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0931	N/A	N/A		0.0448	0.0013	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 9)						4.4202	N/A	N/A		0.7043	0.9664	66.50	Option 4: RVP=9.00, ASTM Slope=2.5

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	-	-	-	251.3935	262.6579	270.0463	273.3399	255.2967	229.6753	-	-	-
Seal Factor (lb-mole/ft yr (mph)^n):	-	-	-	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	-	-	-
Average Wind Speed (mph):	-	-	-	10.0	9.5	9.0	8.4	8.2	8.2	-	-	-
Seal-related Wind Speed Exponent:	-	-	-	1.20	1.20	1.20	1.20	1.20	1.20	-	-	-
Value of Vapor Pressure Function:	-	-	-	0.0591	0.0657	0.0720	0.0792	0.0761	0.0685	-	-	-
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	-	-	-	3.100072	3.401005	3.685667	3.997641	3.865687	3.528944	-	-	-
Tank Diameter (ft):	-	-	-	60	60	60	60	60	60	-	-	-
Vapor Molecular Weight (lb/lb-mole):	-	-	-	67.048695	67.076676	67.100921	67.126471	67.115976	67.087662	-	-	-
Product Factor:	-	-	-	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	-	-	-
Withdrawal Losses (lb):	-	-	-	16.2423	16.2423	16.2423	16.2423	16.2423	16.2423	-	-	-
Net Throughput (gal/month):	-	-	-	4854530	4854530	4854530	4854530	4854530	4854530	-	-	-
Shell Clingage Factor (bbl/1000 sqft):	-	-	-	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	-	-	-
Average Organic Liquid Density (lb/gal):	-	-	-	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-	-	-
Tank Diameter (ft):	-	-	-	60	60	60	60	60	60	-	-	-
Roof Fitting Losses (lb):	-	-	-	295.1420	310.6704	321.9596	329.2626	308.6501	277.6742	-	-	-
Value of Vapor Pressure Function:	-	-	-	0.0591	0.0657	0.0720	0.0792	0.0761	0.0685	-	-	-
Vapor Molecular Weight (lb/lb-mole):	-	-	-	67.048695	67.076676	67.100921	67.126471	67.115976	67.087662	-	-	-
Product Factor:	-	-	-	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	-	-	-
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	-	-	-	893.1371	846.0948	799.2734	743.3885	724.8350	724.8350	-	-	-
Average Wind Speed (mph):	-	-	-	10.0	9.5	9.0	8.4	8.2	8.2	-	-	-

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa (lb-mole/yr)	KFb (lb-mole/(yr mph^n))	m
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1	1.20	0.17	1.00
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1	0.00	67.00	0.98
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10	0.25	0.07	1.00
Roof Drain (3-in. Diameter)/Open	1	0.00	7.00	1.40
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1	0.95	0.14	1.00
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1	2.30	5.90	1.00
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	0.00	0.00	0.00

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Total Losses (lb):	-	-	-	562.78	589.57	608.25	618.84	580.19	523.59	-	-	-

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	401 season
City:	Boise
State:	ID
Company:	Sinclair Oil
Type of Tank:	External Floating Roof

Tank Dimensions

Diameter (ft):	60
Volume(gallons):	839400
Turnovers:	69

Paint Characteristics

Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Paint Condition:	Good

Roof Characteristics

Roof Type:	Double Deck
Fitting Category:	Typical

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal:	Shoe-mounted

Roof Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10
Roof Drain (3-in. Diameter)/Open	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1

Meteorological Data Used in Emission Calculations: Boise, Idaho

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 10-Sinclair HAPs	All	53.12	47.11	59.13	51.12	3.5386	N/A	N/A	66.499				
Benzene						0.9620	N/A	N/A		0.0188	0.0056	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0851	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.5952	N/A	N/A		0.0181	0.0090	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.4472	N/A	N/A		0.0151	0.0021	114.22	Option 1
Naphthalene C-10, H-8						0.0017	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2655	N/A	N/A		0.0972	0.0080	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1018	N/A	N/A		0.0448	0.0014	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0553	N/A	N/A		0.0349	0.0006	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0763	N/A	N/A		0.0448	0.0011	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 10)						4.4434	N/A	N/A		0.7043	0.9717	66.00	Option 4: RVP=10.00, ASTM Slope=2.5

Annual Emission Calculations

Rim Seal Losses (lb):	2982.8153
Seal Factor (lb-mole/ft yr (mph)^n):	0.8000
Average Wind Speed (mph):	8.8
Seal-related Wind Speed Exponent:	1.20
Value of Vapor Pressure Function:	0.0687
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.538575
Tank Diameter (ft):	60
Vapor Molecular Weight (lb/lb-mole):	66.498645
Product Factor:	1.0000
Withdrawal Losses (lb):	181.5636
Annual Net Throughput (gal/yr):	58254360
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	0.0000
Tank Diameter (ft):	60
Roof Fitting Losses (lb):	3568.1163
Value of Vapor Pressure Function:	0.0687
Vapor Molecular Weight (lb/lb-mole):	66.498645
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	780.6081
Average Wind Speed (mph):	8.8

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors Kfa (lb-mole/yr)	Kfb (lb-mole/(yr mph^n))	m
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1	1.20	0.17	1.00
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1	0.00	67.00	0.98
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10	0.25	0.07	1.00
Roof Drain (3-in. Diameter)/Open	1	0.00	7.00	1.40
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1	0.95	0.14	1.00
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1	2.30	5.90	1.00
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	0.00	0.00	0.00

Total Losses (lb): 6732.50

Annual Emissions Report

Liquid Contents	Losses (lbs.): Total Withdrawal	Roof-Fitting	Rim-Seal	Total Standing	Total
Gasoline RVP 10-Sinclair HAPs	181.56	3568.12	2982.82	6550.93	6732.50
Benzene	3.41	20.04	16.75	36.79	40.20
Ethylbenzene	3.76	1.95	1.63	3.58	7.34
Hexane (-n)	3.29	31.99	26.74	58.73	62.01
Isooctane	2.74	7.48	6.25	13.74	16.48
Naphthalene C-10, H-8	0.24	0.00	0.00	0.00	0.24
Toluene	17.65	28.59	23.90	52.50	70.14
Xylene (-m)	8.13	5.05	4.23	9.28	17.41
Xylene (-o)	6.34	2.14	1.79	3.92	10.26
Xylene (-p) "Paraxylene"	8.13	3.79	3.17	6.96	15.09
Gasoline (RVP 10)	127.88	3467.08	2898.36	6365.44	6493.31
Total:	181.56	3568.12	2982.82	6550.93	6732.50

Identification
- Identification No.: 401 season
- City: Boise
- State: ID
- Company: Sinclair Oil
- Type of Tank: External Floating Roof

Tank Dimensions
- Diameter (ft): 60
- Volume(gallons): 839400
- Turnovers: 69

Paint Characteristics
- Shell Condition: Light Rust
- Shell Color/Shade: White/White
- Shell Paint Condition: Good

Roof Characteristics
- Roof Type: Double Deck
- Fitting Category: Typical

Tank Construction and Rim-Seal System
- Construction: Welded
- Primary Seal: Mechanical Shoe
- Secondary Seal: Shoe-mounted

Roof Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10
Roof Drain (3-in. Diameter)/Open	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1

Meteorological Data Used in Emission Calculations: Boise, Idaho

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 13.5-Sinclair HAP	FEB	45.64	41.69	49.59	51.12	4.3253	N/A	N/A	61.859				
Benzene						0.7734	N/A	N/A		0.0188	0.0038	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0647	N/A	N/A		0.0207	0.0003	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13.5)						5.3941	N/A	N/A		0.7043	0.9814	61.50	Option 4: RVP=13.50, ASTM Slope=2.5
Hexane (-n)						1.3001	N/A	N/A		0.0181	0.0061	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.3111	N/A	N/A		0.0151	0.0012	114.22	Option 1
Naphthalene C-10, H-8						0.0012	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2078	N/A	N/A		0.0972	0.0052	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0777	N/A	N/A		0.0448	0.0009	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0417	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0581	N/A	N/A		0.0448	0.0007	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13.5-Sinclair HAP	MAR	48.57	43.26	53.89	51.12	4.5869	N/A	N/A	61.873				
Benzene						0.8432	N/A	N/A		0.0188	0.0039	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0721	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13.5)						5.7178	N/A	N/A		0.7043	0.9808	61.50	Option 4: RVP=13.50, ASTM Slope=2.5
Hexane (-n)						1.4099	N/A	N/A		0.0181	0.0062	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.3622	N/A	N/A		0.0151	0.0013	114.22	Option 1
Naphthalene C-10, H-8						0.0014	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2290	N/A	N/A		0.0972	0.0054	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0865	N/A	N/A		0.0448	0.0009	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0466	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0648	N/A	N/A		0.0448	0.0007	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13.5-Sinclair HAP	DEC	43.27	40.11	46.44	51.12	4.1230	N/A	N/A	61.847				
Benzene						0.7206	N/A	N/A		0.0188	0.0037	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0591	N/A	N/A		0.0207	0.0003	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13.5)						5.1437	N/A	N/A		0.7043	0.9820	61.50	Option 4: RVP=13.50, ASTM Slope=2.5
Hexane (-n)						1.2167	N/A	N/A		0.0181	0.0060	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.2699	N/A	N/A		0.0151	0.0011	114.22	Option 1
Naphthalene C-10, H-8						0.0011	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.1919	N/A	N/A		0.0972	0.0051	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0712	N/A	N/A		0.0448	0.0009	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0380	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0532	N/A	N/A		0.0448	0.0006	106.16	Option 2: A=7.0206, B=1474.403, C=217.773

Month:	January	February	March	April	May	June	July	August	September	October	November	Decemb
Rim Seal Losses (lb):	-	300.3059	365.7037	-	-	-	-	-	-	-	-	249.99
Seal Factor (lb-mole/ft yr (mph)^n):	-	0.8000	0.8000	-	-	-	-	-	-	-	-	0.80
Average Wind Speed (mph):	-	9.0	10.0	-	-	-	-	-	-	-	-	8
Seal-related Wind Speed Exponent:	-	1.20	1.20	-	-	-	-	-	-	-	-	1.
Value of Vapor Pressure Function:	-	0.0869	0.0932	-	-	-	-	-	-	-	-	0.08
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	-	4.325251	4.586899	-	-	-	-	-	-	-	-	4.1229
Tank Diameter (ft):	-	60	60	-	-	-	-	-	-	-	-	[illegible]
Vapor Molecular Weight (lb/lb-mole):	-	61.858732	61.873194	-	-	-	-	-	-	-	-	61.8468
Product Factor:	-	1.0000	1.0000	-	-	-	-	-	-	-	-	1.00
Withdrawal Losses (lb):	-	16.2423	16.2423	-	-	-	-	-	-	-	-	16.24
Net Throughput (gal/month):	-	4854530	4854530	-	-	-	-	-	-	-	-	48545
Shell Clingage Factor (bbl/1000 sqft):	-	0.0015	0.0015	-	-	-	-	-	-	-	-	0.00
Average Organic Liquid Density (lb/gal):	-	0.0000	0.0000	-	-	-	-	-	-	-	-	0.00
Tank Diameter (ft):	-	60	60	-	-	-	-	-	-	-	-	[illegible]
Roof Fitting Losses (lb):	-	358.0363	429.3448	-	-	-	-	-	-	-	-	302.80
Value of Vapor Pressure Function:	-	0.0869	0.0932	-	-	-	-	-	-	-	-	0.08
Vapor Molecular Weight (lb/lb-mole):	-	61.858732	61.873194	-	-	-	-	-	-	-	-	61.8468
Product Factor:	-	1.0000	1.0000	-	-	-	-	-	-	-	-	1.00
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	-	799.2734	893.1371	-	-	-	-	-	-	-	-	715.57
Average Wind Speed (mph):	-	9.0	10.0	-	-	-	-	-	-	-	-	8

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors Kfa (lb-mole/yr)	Kfb (lb-mole/(yr mph^n))	m
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1	1.20	0.17	1.00
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1	0.00	67.00	0.98
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10	0.25	0.07	1.00
Roof Drain (3-in. Diameter)/Open	1	0.00	7.00	1.40
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1	0.95	0.14	1.00
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1	2.30	5.90	1.00
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	0.00	0.00	0.00

Total Losses (lb):	January	February	March	April	May	June	July	August	September	October	November	Decemb
Total Losses (lb):	-	674.58	811.29	-	-	-	-	-	-	-	-	569.[illegible]

Months in Report: February, March, December

Liquid Contents	Losses (lbs.): Total Withdrawal	Roof-Fitting	Rim-Seal	Total Standing	Total
Gasoline RVP 13.5-Sinclair HAP	48.73	1090.18	916.00	2006.19	2054.91
Benzene	0.92	4.11	3.46	7.57	8.49
Ethylbenzene	1.01	0.38	0.32	0.70	1.71
Gasoline (RVP 13.5)	34.32	1069.83	898.89	1968.72	2003.04
Hexane (-n)	0.88	6.65	5.59	12.24	13.13
Isooctane	0.74	1.34	1.13	2.47	3.20
Naphthalene C-10, H-8	0.06	0.00	0.00	0.00	0.06
Toluene	4.74	5.73	4.81	10.54	15.28
Xylene (-m)	2.18	0.99	0.83	1.82	4.00
Xylene (-o)	1.70	0.41	0.35	0.76	2.46
Xylene (-p) "Paraxylene"	2.18	0.74	0.62	1.36	3.54
Total:	48.73	1090.18	916.00	2006.19	2054.91

TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification
- Identification No.: 401 season
- City: Boise
- State: ID
- Company: Sinclair Oil
- Type of Tank: External Floating Roof

Tank Dimensions
- Diameter (ft): 60
- Volume(gallons): 839400
- Turnovers: 69

Paint Characteristics
- Shell Condition: Light Rust
- Shell Color/Shade: White/White
- Shell Paint Condition: Good

Roof Characteristics
- Roof Type: Double Deck
- Fitting Category: Typical

Tank Construction and Rim-Seal System
- Construction: Welded
- Primary Seal: Mechanical Shoe
- Secondary Seal: Shoe-mounted

Roof Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10
Roof Drain (3-in. Diameter)/Open	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1

Meteorological Data Used in Emission Calculations: Boise, Idaho

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 11.5-Sinclair HAP	NOV	46.96	42.88	51.04	51.12	3.6717	N/A	N/A	64.415				
Benzene						0.8042	N/A	N/A		0.0188	0.0046	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0679	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.3486	N/A	N/A		0.0181	0.0074	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.3341	N/A	N/A		0.0151	0.0015	114.22	Option 1
Naphthalene C-10, H-8						0.0013	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2171	N/A	N/A		0.0972	0.0064	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0816	N/A	N/A		0.0448	0.0011	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0438	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0610	N/A	N/A		0.0448	0.0008	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 11.5)						4.6018	N/A	N/A		0.7043	0.9774	64.00	Option 4: RVP=11.50, ASTM Slope=2.5

Month:	January	February	March	April	May	June	July	August	September	October	November	Decembe
Rim Seal Losses (lb):	-	-	-	-	-	-	-	-	-	-	237.5952	-
Seal Factor (lb-mole/ft yr (mph)^n):	-	-	-	-	-	-	-	-	-	-	0.8000	-
Average Wind Speed (mph):	-	-	-	-	-	-	-	-	-	-	8.4	-
Seal-related Wind Speed Exponent:	-	-	-	-	-	-	-	-	-	-	1.20	-
Value of Vapor Pressure Function:	-	-	-	-	-	-	-	-	-	-	0.0717	-
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	-	-	-	-	-	-	-	-	-	-	3.671694	-
Tank Diameter (ft):	-	-	-	-	-	-	-	-	-	-	60	-
Vapor Molecular Weight (lb/lb-mole):	-	-	-	-	-	-	-	-	-	-	64.415283	-
Product Factor:	-	-	-	-	-	-	-	-	-	-	1.0000	-
Withdrawal Losses (lb):	-	-	-	-	-	-	-	-	-	-	16.2423	-
Net Throughput (gal/month):	-	-	-	-	-	-	-	-	-	-	4854530	-
Shell Clingage Factor (bbl/1000 sqft):	-	-	-	-	-	-	-	-	-	-	0.0015	-
Average Organic Liquid Density (lb/gal):	-	-	-	-	-	-	-	-	-	-	0.0000	-
Tank Diameter (ft):	-	-	-	-	-	-	-	-	-	-	60	-
Roof Fitting Losses (lb):	-	-	-	-	-	-	-	-	-	-	286.2049	-
Value of Vapor Pressure Function:	-	-	-	-	-	-	-	-	-	-	0.0717	-
Vapor Molecular Weight (lb/lb-mole):	-	-	-	-	-	-	-	-	-	-	64.415283	-
Product Factor:	-	-	-	-	-	-	-	-	-	-	1.0000	-
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	-	-	-	-	-	-	-	-	-	-	743.3885	-
Average Wind Speed (mph):	-	-	-	-	-	-	-	-	-	-	8.4	-

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa (lb-mole/yr)	KFb (lb-mole/(yr mph^n))	m
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1	1.20	0.17	1.00
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1	0.00	67.00	0.98
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10	0.25	0.07	1.00
Roof Drain (3-in. Diameter)/Open	1	0.00	7.00	1.40
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1	0.95	0.14	1.00
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1	2.30	5.90	1.00
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	0.00	0.00	0.00

Total Losses (lb):	-	-	-	-	-	-	-	-	-	-	540.04	-

Months in Report: November

Liquid Contents	Losses (lbs.): Total Withdrawal	Roof-Fitting	Rim-Seal	Total Standing	Total
Gasoline RVP 11.5-Sinclair HAP	16.24	286.20	237.60	523.80	540.04
Benzene	0.31	1.30	1.08	2.39	2.69
Ethylbenzene	0.34	0.12	0.10	0.22	0.56
Hexane (-n)	0.29	2.11	1.75	3.86	4.15
Isooctane	0.25	0.44	0.36	0.80	1.04
Naphthalene C-10, H-8	0.02	0.00	0.00	0.00	0.02
Toluene	1.58	1.82	1.51	3.33	4.91
Xylene (-m)	0.73	0.32	0.26	0.58	1.31
Xylene (-o)	0.57	0.13	0.11	0.24	0.81
Xylene (-p) "Paraxylene"	0.73	0.24	0.20	0.43	1.16
Gasoline (RVP 11.5)	11.44	279.73	232.22	511.95	523.39
Total:	16.24	286.20	237.60	523.80	540.04

Identification

Identification No.:	401 season
City:	Boise
State:	ID
Company:	Sinclair Oil
Type of Tank:	External Floating Roof

Tank Dimensions

Diameter (ft):	60
Volume(gallons):	839400
Turnovers:	69

Paint Characteristics

Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Paint Condition:	Good

Roof Characteristics

Roof Type:	Double Deck
Fitting Category:	Typical

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal:	Shoe-mounted

Roof Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10
Roof Drain (3-in. Diameter)/Open	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1

Meteorological Data Used in Emission Calculations: Boise, Idaho

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 15-Sinclair HAPs	JAN	42.41	39.23	45.60	51.12	4.5876	N/A	N/A	61.008				
Benzene						0.7021	N/A	N/A		0.0188	0.0032	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0573	N/A	N/A		0.0207	0.0003	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.1875	N/A	N/A		0.0181	0.0053	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.2550	N/A	N/A		0.0151	0.0009	114.22	Option 1
Naphthalene C-10, H-8						0.0010	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.1864	N/A	N/A		0.0972	0.0044	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0690	N/A	N/A		0.0448	0.0008	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0368	N/A	N/A		0.0349	0.0003	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0515	N/A	N/A		0.0448	0.0006	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline (RVP 15)						5.7176	N/A	N/A		0.7043	0.9842	60.70	Option 4: RVP=15.00, ASTM Slope=2.5

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	275.9286	-	-	-	-	-	-	-	-	-	-	-
Seal Factor (lb-mole/ft yr (mph)^n):	0.6000	-	-	-	-	-	-	-	-	-	-	-
Average Wind Speed (mph):	8.0	-	-	-	-	-	-	-	-	-	-	-
Seal-related Wind Speed Exponent:	1.20	-	-	-	-	-	-	-	-	-	-	-
Value of Vapor Pressure Function:	0.0932	-	-	-	-	-	-	-	-	-	-	-
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	4.587563	-	-	-	-	-	-	-	-	-	-	-
Tank Diameter (ft):	60	-	-	-	-	-	-	-	-	-	-	-
Vapor Molecular Weight (lb/lb-mole):	61.007919	-	-	-	-	-	-	-	-	-	-	-
Product Factor:	1.0000	-	-	-	-	-	-	-	-	-	-	-
Withdrawal Losses (lb):	16.2423	-	-	-	-	-	-	-	-	-	-	-
Net Throughput (gal/month):	4854530	-	-	-	-	-	-	-	-	-	-	-
Shell Clingage Factor (bbl/1000 sqft):	0.0015	-	-	-	-	-	-	-	-	-	-	-
Average Organic Liquid Density (lb/gal):	0.0000	-	-	-	-	-	-	-	-	-	-	-
Tank Diameter (ft):	60	-	-	-	-	-	-	-	-	-	-	-
Roof Fitting Losses (lb):	334.8489	-	-	-	-	-	-	-	-	-	-	-
Value of Vapor Pressure Function:	0.0932	-	-	-	-	-	-	-	-	-	-	-
Vapor Molecular Weight (lb/lb-mole):	61.007919	-	-	-	-	-	-	-	-	-	-	-
Product Factor:	1.0000	-	-	-	-	-	-	-	-	-	-	-
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	706.3198	-	-	-	-	-	-	-	-	-	-	-
Average Wind Speed (mph):	8.0	-	-	-	-	-	-	-	-	-	-	-

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors Kfa (lb-mole/yr)	Kfb (lb-mole/(yr mph^n))	m
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1	1.20	0.17	1.00
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1	0.00	67.00	0.98
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10	0.25	0.07	1.00
Roof Drain (3-in. Diameter)/Open	1	0.00	7.00	1.40
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1	0.95	0.14	1.00
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1	2.30	5.90	1.00
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	0.00	0.00	0.00

Total Losses (lb):	627.02	-	-	-	-	-	-	-	-	-	-	-

Months in Report: January

Liquid Contents	Losses (lbs.): Total Withdrawal	Roof-Fitting	Rim-Seal	Total Standing	Total
Gasoline RVP 15-Sinclair HAPs	16.24	334.85	275.93	610.78	627.02
Benzene	0.31	1.08	0.89	1.97	2.28
Ethylbenzene	0.34	0.10	0.08	0.18	0.51
Hexane (-n)	0.29	1.76	1.45	3.21	3.50
Isooctane	0.25	0.32	0.26	0.57	0.82
Naphthalene C-10, H-8	0.02	0.00	0.00	0.00	0.02
Toluene	1.58	1.48	1.22	2.71	4.28
Xylene (-m)	0.73	0.25	0.21	0.46	1.19
Xylene (-o)	0.57	0.11	0.09	0.19	0.76
Xylene (-p) "Paraxylene"	0.73	0.19	0.16	0.34	1.07
Gasoline (RVP 15)	11.44	329.57	271.58	601.14	612.58
Total:	16.24	334.85	275.93	610.78	627.02

Title V Engineer: DM
Company Name: Sinclair Oil Corp.
Location: Boise, Idaho
Date Created: January 4, 1996
Today's Date: 01/25/96

Calculation of Loading Rack Emissions ***THIS SPREADSHEET IS DESIGNED TO ESTIMATE EMISSIONS BY MONTH***

ASSUMPTIONS

1. TANKS2.0 provides the monthly average true vapor pressure of the gasoline product AND the molar fraction of HAP constituents in the vapor phase of the gasoline product.
2. **RVP 11 gasoline with Sinclair's HAPs used for all calculations.**

Reference: AP-42, Sect. 5.2
only january is changed below

JANUARY **JANUARY** **JANUARY**

$L_L = 12.46\ SPM/T$

where L_L = loading loss, lb/1000 gal — L_L = see Chart
S = saturation factor, dimensionless, 1.0 — S = see 1
P = true vapor pressure, psia — P = 3.1679
M = molecular weight of vapor, lb/lb-mole — M = 65.103
T = absolute temperature, °R — T = 511.1

JANUARY Gasoline Throughput, gallons per month, = 19438.3 E^3 gallons

JANUARY

HAPs Compounds	Vapor Mass Fraction	L_L (lb/10³ gal)	Emissions (Ton/month)
Benzene	0.0046	0.0231	0.22
Ethylbenzene	0.0004	0.0020	0.02
Hexane	0.0075	0.0377	0.37
Naphthalene	0.0000	3.00E-06	2.91E-05
Toluene	0.0063	0.0317	0.31
Trimethylpentane (2,2,4)	0.0013	0.0065	0.06
Xylene-m	0.0011	0.0055	0.05
Xylene-o	0.0004	0.0020	0.02
Xylene-p	0.0008	0.0040	0.04
Gasoline (RVP-11)	0.9775	4.9146	47.77
TOTAL			48.86
TOTAL--HAPS ONLY			1.09

or all months..

FEBRUARY **FEBRUARY** **FEBRUARY**

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute temperature, °R

L_L =	see Chart
S = see	1
P =	3.892
M =	65.122
T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

FEBRUARY

HAPs Compounds	Mole Fraction	L_L (lb/10 3 gal)	Emissions (Ton/month)
Benzene	0.0047	0.0290	0.28
Ethylbenzene	0.0004	0.0025	0.02
Hexane	0.0077	0.0476	0.46
Naphthalene	0.0000	3.68E-06	3.58E-05
Toluene	0.0066	0.0408	0.40
Trimethylpentane (2,2,4)	0.0015	0.0093	0.09
Xylene-m	0.0011	0.0068	0.07
Xylene-o	0.0005	0.0031	0.03
Xylene-p	0.0008	0.0049	0.05
Gasoline (RVP-11)	0.9766	6.0341	58.65
TOTAL			60.05
TOTAL--HAPS ONLY			1.40

MARCH **MARCH** **MARCH**

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute temperature, °R

L_L =	see Chart
S = see	1
P =	3.6011
M =	65.138
T =	511.1

I Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

MARCH

HAPs Compounds	Mole Fraction	L_L (lb/10 3 gal)	Emissions (Ton/month)
Benzene	0.0049	0.0280	0.27
Ethylbenzene	0.0005	0.0029	0.03
Hexane	0.0078	0.0446	0.43
Naphthalene	0.0000	3.41E-06	3.31E-05
Toluene	0.0078	0.0446	0.43
Trimethylpentane (2,2,4)	0.0017	0.0097	0.09
Xylene-m	0.0012	0.0069	0.07
Xylene-o	0.0005	0.0029	0.03
Xylene-p	0.0009	0.0051	0.05
Gasoline (RVP-11)	0.9758	5.5799	54.23
TOTAL			55.64
TOTAL--HAPS ONLY			1.41

or all months

APRIL

L_L = 12.46 SPM/T

APRIL

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute temperature, °R

APRIL

L_L =	see Chart
S = see	1
P =	3.8986
M =	65.138
T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

APRIL

HAPs Compounds	Mole Fraction	L_L (lb/10 3 gal)	Emissions (Ton/month)
Benzene	0.0050	0.0310	0.30
Ethylbenzene	0.0005	0.0031	0.03
Hexane	0.0080	0.0495	0.48
Naphthalene	0.0000	3.69E-06	3.59E-05
Toluene	0.0072	0.0446	0.43
Trimethylpentane (2,2,4)	0.0019	0.0118	0.11
Xylene-m	0.0013	0.0080	0.08
Xylene-o	0.0005	0.0031	0.03
Xylene-p	0.0009	0.0056	0.05
Gasoline (RVP-10)	0.9747	6.0341	58.65
TOTAL			60.17
TOTAL--HAPS ONLY			1.52

MAY

L_L = 12.46 SPM/T

MAY

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute temperature, °R

MAY

L_L =	see Chart
S = see	1
P =	4.2652
M =	65.185
T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

MAY

HAPs Compounds	Mole Fraction	L_L (lb/10 3 gal)	Emissions (Ton/month)
Benzene	0.0052	0.0352	0.34
Ethylbenzene	0.0005	0.0034	0.03
Hexane	0.0083	0.0563	0.55
Naphthalene	0.0000	4.04E-06	3.93E-05
Toluene	0.0075	0.0508	0.49
Trimethylpentane (2,2,4)	0.0020	0.0136	0.13
Xylene-m	0.0014	0.0095	0.09
Xylene-o	0.0006	0.0041	0.04
Xylene-p	0.0010	0.0068	0.07
Gasoline (RVP-11)	0.9735	6.5981	64.13
TOTAL			65.87
TOTAL--HAPS ONLY			1.75

or all months

JUNE

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, psia

M = molecular weight of vapor, lb/lb-mole

T = absolute temperature, °R

L_L =	see Chart
S = see	1
P =	4.6111
M =	65.206
T =	511.1

Gasoline Throughput, gallons per month, = 19438.3 E^3 gallons

JUNE

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0054	0.0396	0.38
Ethylbenzene	0.0006	0.0044	0.04
Hexane	0.0085	0.0623	0.61
Naphthalene	0.0000	4.37E-06	4.25E-05
Toluene	0.0079	0.0579	0.56
Trimethylpentane (2,2,4)	0.0022	0.0161	0.16
Xylene-m	0.0014	0.0103	0.10
Xylene-o	0.0006	0.0044	0.04
Xylene-p	0.0010	0.0073	0.07
Gasoline (RVP-11)	0.9735	7.1355	69.35
TOTAL			71.32
TOTAL--HAPS ONLY			1.97

JULY

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, psia

M = molecular weight of vapor, lb/lb-mole

T = absolute temperature, °R

L_L =	see Chart
S = see	1
P =	4.9892
M =	65.229
T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

JULY

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0054	0.0428	0.42
Ethylbenzene	0.0006	0.0048	0.05
Hexane	0.0085	0.0674	0.66
Naphthalene	0.0000	4.73E-06	4.60E-05
Toluene	0.0079	0.0627	0.61
Trimethylpentane (2,2,4)	0.0022	0.0175	0.17
Xylene-m	0.0014	0.0111	0.11
Xylene-o	0.0006	0.0048	0.05
Xylene-p	0.0011	0.0087	0.08
Gasoline (RVP-11)	0.9724	7.7146	74.98
TOTAL			77.12
TOTAL--HAPS ONLY			2.14

or all months

AUGUST | AUGUST | AUGUST

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal | L_L = see Chart
S = saturation factor, dimensionless, 1.0 | S = see 1
P = true vapor pressure, psia | P = 4.8293
M = molecular weight of vapor, lb/lb-mole | M = 65.219
T = absolute temperature, °R | T = 511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

AUGUST

HAPs Compounds	Mole Fraction	L_L (lb/10 $_3$ gal)	Emissions (Ton/month)
Benzene	0.0055	0.0422	0.41
Ethylbenzene	0.0006	0.0046	0.04
Hexane	0.0086	0.0660	0.64
Naphthalene	0.0000	4.58E-06	4.45E-05
Toluene	0.0081	0.0622	0.60
Trimethylpentane (2,2,4)	0.0023	0.0177	0.17
Xylene-m	0.0015	0.0115	0.11
Xylene-o	0.0006	0.0046	0.04
Xylene-p	0.0011	0.0084	0.08
Gasoline (RVP-11)	0.9717	7.4608	72.51
TOTAL			74.62
TOTAL--HAPS ONLY			2.11

SEPTEMBER | SEPTEMBER | SEPTEMBER

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal | L_L = see Chart
S = saturation factor, dimensionless, 1.0 | S = see 1
P = true vapor pressure, psia | P = 4.4208
M = molecular weight of vapor, lb/lb-mole | M = 65.194
T = absolute temperature, °R | T = 511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

SEPTEMBER

HAPs Compounds	Mole Fraction	L_L (lb/10 $_3$ gal)	Emissions (Ton/month)
Benzene	0.0053	0.0372	0.36
Ethylbenzene	0.0005	0.0035	0.03
Hexane	0.0084	0.0590	0.57
Naphthalene	0.0000	4.19E-06	4.07E-05
Toluene	0.0084	0.0590	0.57
Trimethylpentane (2,2,4)	0.0021	0.0148	0.14
Xylene-m	0.0014	0.0098	0.10
Xylene-o	0.0006	0.0042	0.04
Xylene-p	0.0010	0.0070	0.07
Gasoline (RVP-11)	0.9730	6.8362	66.44
TOTAL			68.33
TOTAL--HAPS ONLY			1.89

or all months

OCTOBER	OCTOBER	OCTOBER		
L_L = 12.46 SPM/T	where L_L = loading loss, lb/1000 gal		L_L =	see Chart
	S = saturation factor, dimensionless, 1.0		S = see	1
	P = true vapor pressure, psia		P =	3.9387
	M = molecular weight of vapor, lb/lb-mole		M =	65.163
	T = absolute temperature, °R		T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

OCTOBER

HAPs Compounds	Mole Fraction	L_L (lb/10 ; gal)	Emissions (Ton/month)
Benzene	0.0050	0.0313	0.30
Ethylbenzene	0.0005	0.0031	0.03
Hexane	0.0081	0.0507	0.49
Naphthalene	0.0000	3.73E-06	3.62E-05
Toluene	0.0072	0.0450	0.44
Trimethylpentane (2,2,4)	0.0019	0.0119	0.12
Xylene-m	0.0013	0.0081	0.08
Xylene-o	0.0005	0.0031	0.03
Xylene-p	0.0010	0.0063	0.06
Gasoline (RVP-11)	0.9746	6.0978	59.27
TOTAL			60.82
TOTAL--HAPS ONLY			1.55

NOVEMBER	NOVEMBER	NOVEMBER		
L_L = 12.46 SPM/T	where L_L = loading loss, lb/1000 gal		L_L =	see Chart
	S = saturation factor, dimensionless, 1.0		S = see	1
	P = true vapor pressure, psia		P =	3.4834
	M = molecular weight of vapor, lb/lb-mole		M =	65.129
	T = absolute temperature, °R		T =	511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallons

NOVEMBER

HAPs Compounds	Mole Fraction	L_L (lb/10 ; gal)	Emissions (Ton/month)
Benzene	0.0048	0.0265	0.26
Ethylbenzene	0.0004	0.0022	0.02
Hexane	0.0077	0.0426	0.41
Naphthalene	0.0000	3.30E-06	3.20E-05
Toluene	0.0067	0.0371	0.36
Trimethylpentane (2,2,4)	0.0016	0.0088	0.09
Xylene-m	0.0012	0.0066	0.06
Xylene-o	0.0005	0.0028	0.03
Xylene-p	0.0009	0.0050	0.05
Gasoline (RVP-11)	0.9762	5.3990	52.47
TOTAL			53.75
TOTAL--HAPS ONLY			1.28

or all months

DECEMBER DECEMBER DECEMBER

$L_L = 12.46$ SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, psia
M = molecular weight of vapor, lb/lb-mole
T = absolute temperature, °R

L_L =		see Chart
S = see		1
P =		3.2257
M =		65.108
T =		511.1

Gasoline Throughput, gallons per month = 19438.3 E^3 gallon

DECEMBER

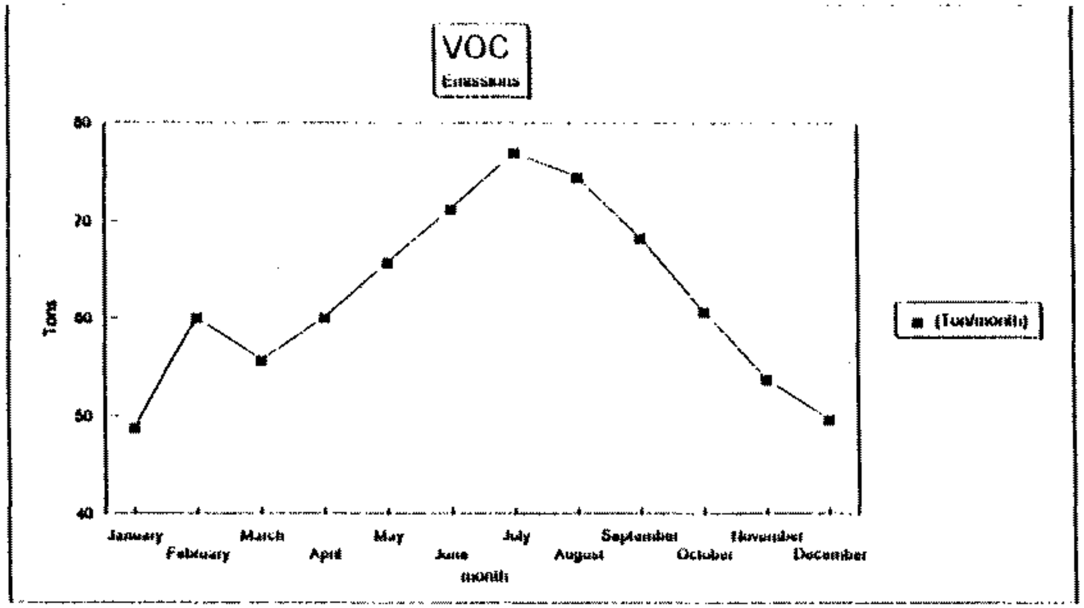
HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0046	0.0236	0.23
Ethylbenzene	0.0004	0.0020	0.02
Hexane	0.0075	0.0384	0.37
Naphthalene	0.0000	3.05E-06	2.97E-05
Toluene	0.0064	0.0328	0.32
Trimethylpentane (2,2,4)	0.0014	0.0072	0.07
Xylene-m	0.0011	0.0056	0.05
Xylene-o	0.0005	0.0026	0.02
Xylene-p	0.0008	0.0041	0.04
Gasoline (RVP-11)	0.9772	5.0031	48.63
TOTAL			49.76
TOTAL--HAPS ONLY			1.13

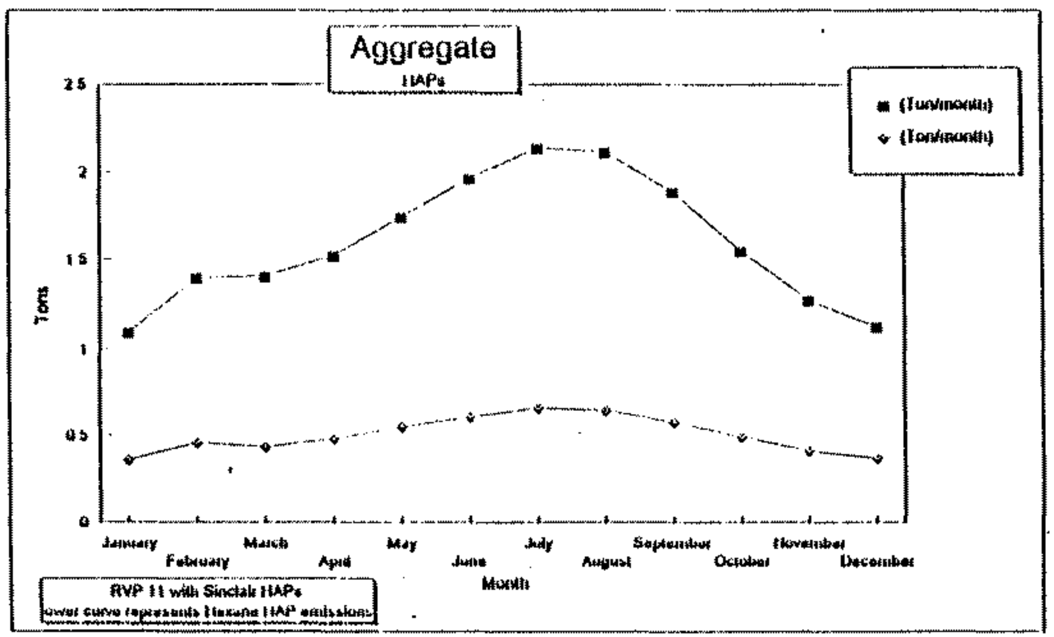
ANNUAL LOADING RACK EMISSIONS (RVP 11 with Sinclair HAPs)

VOC Emissions (Ton/yr)	Aggreg HAP Emissions (Ton/yr)	Single HAP Hexane Emiss (Ton/yr)	Single HAP Toluene (Ton/yr)
746.30	19.23	6.05	4.46

	VOC Emissions (Ton/month)	Aggregate HAPs (Ton/month)	Hexane Emissions (Ton/month)
January	48.86	1.09	0.37
February	60.05	1.40	0.46
March	55.64	1.41	0.43
April	60.17	1.52	0.48
May	65.87	1.75	0.55
June	71.32	1.97	0.61
July	77.12	2.14	0.66
August	74.62	2.11	0.64
September	68.33	1.89	0.57
October	60.82	1.55	0.49
November	53.75	1.28	0.41
December	49.76	1.13	0.37

or all months





or all months

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

RVP 11. W/ SINCLAIR HAPs.

Identification
- Identification No.: 401 RVP 11
- City: Boise
- State: ID
- Company: Sinclair Oil Corp.
- Type of Tank: External Floating Roof

Tank Dimensions
- Diameter (ft): 60
- Volume(gallons): 839400
- Turnovers: 69

Paint Characteristics
- Shell Condition: Light Rust
- Shell Color/Shade: White/White
- Shell Paint Condition: Good

Roof Characteristics
- Roof Type: Double Deck
- Fitting Category: Typical

Tank Construction and Rim-Seal System
- Construction: Welded
- Primary Seal: Mechanical Shoe
- Secondary Seal: Rim-mounted

Roof Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10
Roof Drain (3-in. Diameter)/Open	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1

Meteorological Data Used in Emission Calculations: Boise, Idaho

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 11	JAN	42.41	39.23	45.60	51.12	3.1679	N/A	N/A	65.103				
Gasoline - Unleaded (RVP 11)						3.9791	N/A	N/A		0.7043	0.9775	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						0.7021	N/A	N/A		0.0188	0.0046	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0573	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.1875	N/A	N/A		0.0181	0.0075	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.2550	N/A	N/A		0.0151	0.0013	114.22	Option 1
Naphthalene C-10, H-8						0.0010	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.1864	N/A	N/A		0.0972	0.0063	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0690	N/A	N/A		0.0448	0.0011	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0368	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0515	N/A	N/A		0.0448	0.0008	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	FEB	45.64	41.69	49.59	51.12	3.3892	N/A	N/A	65.122				
Gasoline - Unleaded (RVP 11)						4.2544	N/A	N/A		0.7043	0.9766	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						0.7734	N/A	N/A		0.0188	0.0047	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0647	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.3001	N/A	N/A		0.0181	0.0077	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.3111	N/A	N/A		0.0151	0.0015	114.22	Option 1
Naphthalene C-10, H-8						0.0012	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2078	N/A	N/A		0.0972	0.0066	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0777	N/A	N/A		0.0448	0.0011	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0417	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0581	N/A	N/A		0.0448	0.0008	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	MAR	48.57	43.26	53.89	51.12	3.6011	N/A	N/A	65.138				
Gasoline - Unleaded (RVP 11)						4.5178	N/A	N/A		0.7043	0.9758	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						0.8432	N/A	N/A		0.0188	0.0049	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0721	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.4099	N/A	N/A		0.0181	0.0078	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.3622	N/A	N/A		0.0151	0.0017	114.22	Option 1
Naphthalene C-10, H-8						0.0014	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2290	N/A	N/A		0.0972	0.0068	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0865	N/A	N/A		0.0448	0.0012	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0466	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0648	N/A	N/A		0.0448	0.0009	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	APR	52.46	45.90	59.03	51.12	3.8986	N/A	N/A	65.160				
Gasoline - Unleaded (RVP 11)						4.8873	N/A	N/A		0.7043	0.9747	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						0.9440	N/A	N/A		0.0188	0.0050	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0831	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.5673	N/A	N/A		0.0181	0.0080	86.17	Option 2: A=6.8760, B=1171.170, C=224.410

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Isooctane						0.4345	N/A	N/A		0.0151	0.0019	114.22	Option 1
Naphthalene C-10, H-8						0.0017	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2600	N/A	N/A		0.0972	0.0072	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0995	N/A	N/A		0.0448	0.0013	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0539	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0746	N/A	N/A		0.0448	0.0009	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	MAY	56.94	49.41	64.47	51.12	4.2652	N/A	N/A	65.185				
Gasoline - Unleaded (RVP 11)						5.3421	N/A	N/A		0.7043	0.9735	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						1.0722	N/A	N/A		0.0188	0.0052	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0975	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.7660	N/A	N/A		0.0181	0.0083	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.5209	N/A	N/A		0.0151	0.0020	114.22	Option 1
Naphthalene C-10, H-8						0.0021	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2999	N/A	N/A		0.0972	0.0075	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1165	N/A	N/A		0.0448	0.0014	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0636	N/A	N/A		0.0349	0.0006	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0874	N/A	N/A		0.0448	0.0010	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	JUN	60.89	52.92	68.86	51.12	4.6111	N/A	N/A	65.206				
Gasoline - Unleaded (RVP 11)						5.7708	N/A	N/A		0.7043	0.9724	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						1.1969	N/A	N/A		0.0188	0.0054	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1119	N/A	N/A		0.0207	0.0006	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.9580	N/A	N/A		0.0181	0.0085	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6006	N/A	N/A		0.0151	0.0022	114.22	Option 1
Naphthalene C-10, H-8						0.0025	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3394	N/A	N/A		0.0972	0.0079	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1334	N/A	N/A		0.0448	0.0014	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0734	N/A	N/A		0.0349	0.0006	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1003	N/A	N/A		0.0448	0.0011	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	JUL	64.94	56.05	73.82	51.12	4.9892	N/A	N/A	65.229				
Gasoline - Unleaded (RVP 11)						6.2389	N/A	N/A		0.7043	0.9713	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						1.3371	N/A	N/A		0.0188	0.0056	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1286	N/A	N/A		0.0207	0.0006	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						2.1725	N/A	N/A		0.0181	0.0087	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6945	N/A	N/A		0.0151	0.0023	114.22	Option 1
Naphthalene C-10, H-8						0.0030	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3843	N/A	N/A		0.0972	0.0083	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1530	N/A	N/A		0.0448	0.0015	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0847	N/A	N/A		0.0349	0.0007	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1152	N/A	N/A		0.0448	0.0011	106.16	Option 2: A=7.0206, B=1474.403, C=217.773

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 11	AUG	63.26	55.14	71.38	51.12	4.8293	N/A	N/A	65.219				
Gasoline - Unleaded (RVP 11)						6.0411	N/A	N/A		0.7043	0.9717	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						1.2774	N/A	N/A		0.0188	0.0055	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1215	N/A	N/A		0.0207	0.0006	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						2.0813	N/A	N/A		0.0181	0.0086	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6555	N/A	N/A		0.0151	0.0023	114.22	Option 1
Naphthalene C-10, H-8						0.0028	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3651	N/A	N/A		0.0972	0.0081	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1446	N/A	N/A		0.0448	0.0015	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0798	N/A	N/A		0.0349	0.0006	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1088	N/A	N/A		0.0448	0.0011	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	SEP	58.75	51.48	66.02	51.12	4.4208	N/A	N/A	65.194				
Gasoline - Unleaded (RVP 11)						5.5350	N/A	N/A		0.7043	0.9730	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						1.1278	N/A	N/A		0.0188	0.0053	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1039	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.8518	N/A	N/A		0.0181	0.0084	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.5558	N/A	N/A		0.0151	0.0021	114.22	Option 1
Naphthalene C-10, H-8						0.0023	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3175	N/A	N/A		0.0972	0.0077	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1240	N/A	N/A		0.0448	0.0014	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0679	N/A	N/A		0.0349	0.0006	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0931	N/A	N/A		0.0448	0.0010	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	OCT	52.97	47.03	58.91	51.12	3.9387	N/A	N/A	65.163				
Gasoline - Unleaded (RVP 11)						4.9369	N/A	N/A		0.7043	0.9746	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						0.9578	N/A	N/A		0.0188	0.0050	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0846	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.5887	N/A	N/A		0.0181	0.0081	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.4443	N/A	N/A		0.0151	0.0019	114.22	Option 1
Naphthalene C-10, H-8						0.0017	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2642	N/A	N/A		0.0972	0.0072	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1013	N/A	N/A		0.0448	0.0013	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0550	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0759	N/A	N/A		0.0448	0.0010	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	NOV	46.96	42.88	51.04	51.12	3.4834	N/A	N/A	65.129				
Gasoline - Unleaded (RVP 11)						4.3714	N/A	N/A		0.7043	0.9762	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						0.8042	N/A	N/A		0.0188	0.0048	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0679	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.3486	N/A	N/A		0.0181	0.0077	86.17	Option 2: A=6.8760, B=1171.170, C=224.410

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Isooctane						0.3341	N/A	N/A		0.0151	0.0016	114.22	Option 1
Naphthalene C-10, H-8						0.0013	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2171	N/A	N/A		0.0972	0.0067	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0816	N/A	N/A		0.0448	0.0012	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0438	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0610	N/A	N/A		0.0448	0.0009	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 11	DEC	43.27	40.11	46.44	51.12	3.2257	N/A	N/A	65.108				
Gasoline - Unleaded (RVP 11)						4.0510	N/A	N/A		0.7043	0.9772	64.70	Option 4: RVP=11.00, ASTM Slope=2.5
Benzene						0.7206	N/A	N/A		0.0188	0.0046	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0591	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Hexane (-n)						1.2167	N/A	N/A		0.0181	0.0075	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.2699	N/A	N/A		0.0151	0.0014	114.22	Option 1
Naphthalene C-10, H-8						0.0011	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.1919	N/A	N/A		0.0972	0.0064	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0712	N/A	N/A		0.0448	0.0011	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0380	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0532	N/A	N/A		0.0448	0.0008	106.16	Option 2: A=7.0206, B=1474.403, C=217.773

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

Months in Report: January, February, March, April, May, June, July, August, September, October, November, December

Liquid Contents	Losses (lbs.): Total Withdrawal	Roof Fitting	Rim Seal	Total Standing	Total
Gasoline RVP 11	179.65	4011.53	542.67	4554.20	4733.85
Gasoline - Unleaded (RVP 11)	126.53	3907.97	528.66	4436.63	4563.15
Benzene	3.38	20.49	2.77	23.26	26.64
Ethylbenzene	3.72	2.02	0.27	2.29	6.01
Hexane (-n)	3.25	32.63	4.41	37.04	40.29
Isooctane	2.71	7.63	1.03	8.67	11.38
Naphthalene C-10, H-8	0.23	0.00	0.00	0.00	0.24
Toluene	17.46	29.41	3.98	33.39	50.86
Xylene (-m)	8.05	5.23	0.71	5.94	13.99
Xylene (-o)	6.27	2.22	0.30	2.52	8.79
Xylene (-p) "Paraxylene"	8.05	3.92	0.53	4.45	12.50
Total:	179.65	4011.53	542.67	4554.20	4733.85

170.7 LB COMBINED HAPs
0.0854 TON/YR COMBINED HAPs

Title V Engineer:	DM
Company Name:	Sinclair Oil Corp.
Location:	Boise, Idaho
Date Created:	January 4, 1996
Today's Date:	01/19/96

Calculation of Loading Rack Emissions ***THIS SPREADSHEET IS DESIGNED TO ESTIMATE EMISSIONS BY MONTH***

ASSUMPTIONS

1. TANKS2.0 provides the monthly average true vapor pressure of the gasoline product AND the molar fraction of HAP constituents in the vapor phase of the gasoline product.

Reference: AP-42, Sect. 5.2

only january is changed below

JANUARY **JANUARY** **JANUARY**

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, psia

M = molecular weight of vapor, 66.5 lb/lb-mole

T = absolute temperature, 508°R

L_L =	see Chart
S = see	1
P =	3.8727
M =	62.354
T =	511.1

JANUARY Gasoline Throughput, gallons per month, = 19438.3 E^3 gallons

JANUARY

HAPs Compounds	Vapor Mass Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0038	0.0224	0.22
Ethylbenzene	0.0003	0.0018	0.02
Hexane	0.0062	0.0365	0.35
Naphthalene	0.0000	3.51E-06	3.41E-05
Toluene	0.0052	0.0306	0.30
Trimethylpentane (2,2,4)	0.0011	0.0065	0.06
Xylene-m	0.0009	0.0053	0.05
Xylene-o	0.0004	0.0024	0.02
Xylene-p	0.0007	0.0041	0.04
Gasoline (RVP-13)	0.9814	5.7772	56.15
TOTAL			57.21
TOTAL--HAPS ONLY			1.06

FEBRUARY FEBRUARY FEBRUARY

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, 4.0 psia

M = molecular weight of vapor, 66.5 lb/lb-mole

T = absolute temperature, 508°R

L_L =	see Chart
S = see	1
P =	4.1361
M =	62.371
T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

FEBRUARY

HAPs Compounds	Mole Fraction	L_L (lb/10³ gal)	Emissions (Ton/month)
Benzene	0.0039	0.0245	0.24
Ethylbenzene	0.0004	0.0025	0.02
Hexane	0.0063	0.0396	0.39
Naphthalene	0.0000	3.75E-06	3.64E-05
Toluene	0.0054	0.0340	0.33
Trimethylpentane (2,2,4)	0.0013	0.0082	0.08
Xylene-m	0.0009	0.0057	0.06
Xylene-o	0.0004	0.0025	0.02
Xylene-p	0.0007	0.0044	0.04
Gasoline (RVP-10)	0.9806	6.1668	59.94
12			
TOTAL			61.12
TOTAL--HAPS ONLY			1.18

MARCH MARCH MARCH

$L_L = 12.46\ SPM/T$ where L_L = loading loss, lb/1000 gal

S = saturation factor, dimensionless, 1.0

P = true vapor pressure, 4.0 psia

M = molecular weight of vapor, 66.5 lb/lb-mole

T = absolute temperature, 508°R

L_L =	see Chart
S = see	1
P =	4.3878
M =	62.386
T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

MARCH

HAPs Compounds	Mole Fraction	L_L (lb/10³ gal)	Emissions (Ton/month)
Benzene	0.0040	0.0267	0.26
Ethylbenzene	0.0004	0.0027	0.03
Hexane	0.0065	0.0434	0.42
Naphthalene	0.0000	3.98E-06	3.87E-05
Toluene	0.0057	0.0380	0.37
Trimethylpentane (2,2,4)	0.0014	0.0093	0.09
Xylene-m	0.0010	0.0067	0.06
Xylene-o	0.0004	0.0027	0.03
Xylene-p	0.0007	0.0047	0.05
Gasoline (RVP-10)	0.9799	6.5390	63.55
13			
TOTAL			64.86
TOTAL--HAPS ONLY			1.30

APRIL APRIL APRIL

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, 4.0 psia
M = molecular weight of vapor, 66.5 lb/lb-mole
T = absolute temperature, 508°R

L_L =	see Chart
S = see	1
P =	4.7407
M =	62.405
T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

APRIL

HAPs Compounds	Mole Fraction	L_L (lb/10 3 gal)	Emissions (Ton/month)
Benzene	0.0042	0.0303	0.29
Ethylbenzene	0.0004	0.0029	0.03
Hexane	0.0067	0.0483	0.47
Naphthalene	0.0000	4.30E-06	4.18E-05
Toluene	0.0059	0.0426	0.41
Trimethylpentane (2,2,4)	0.0015	0.0108	0.11
Xylene-m	0.0010	0.0072	0.07
Xylene-o	0.0004	0.0029	0.03
Xylene-p	0.0008	0.0058	0.06
Gasoline (RVP-10) 13	0.9790	7.0606	68.62
TOTAL			70.09
TOTAL--HAPS ONLY			1.47

MAY MAY MAY

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, 4.0 psia
M = molecular weight of vapor, 66.5 lb/lb-mole
T = absolute temperature, 508°R

L_L =	see Chart
S = see	1
P =	5.1744
M =	62.447
T =	511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

MAY

HAPs Compounds	Mole Fraction	L_L (lb/10 3 gal)	Emissions (Ton/month)
Benzene	0.0045	0.0354	0.34
Ethylbenzene	0.0005	0.0039	0.04
Hexane	0.0071	0.0559	0.54
Naphthalene	0.0000	4.69E-06	4.56E-05
Toluene	0.0066	0.0520	0.51
Trimethylpentane (2,2,4)	0.0018	0.0142	0.14
Xylene-m	0.0012	0.0095	0.09
Xylene-o	0.0005	0.0039	0.04
Xylene-p	0.0009	0.0071	0.07
Gasoline (RVP-10) 13	0.9779	7.7030	74.87
TOTAL			76.64
TOTAL--HAPS ONLY			1.77

AUGUST AUGUST AUGUST

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, 4.0 psia
M = molecular weight of vapor, 66.5 lb/lb-mole
T = absolute temperature, 508°R

L_L = see Chart
S = see 1
P = 5.8401
M = 62.459
T = 511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

AUGUST

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0046	0.0409	0.40
Ethylbenzene	0.0005	0.0044	0.04
Hexane	0.0072	0.0640	0.62
Naphthalene	0.0000	5.30E-06	5.15E-05
Toluene	0.0068	0.0605	0.59
Trimethylpentane (2,2,4)	0.0019	0.0169	0.16
Xylene-m	0.0012	0.0107	0.10
Xylene-o	0.0005	0.0044	0.04
Xylene-p	0.0009	0.0080	0.08
Gasoline (RVP 10) /3	0.9764	8.6824	84.39
TOTAL			86.43
TOTAL--HAPS ONLY			2.04

SEPTEMBER SEPTEMBER SEPTEMBER

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, 4.0 psia
M = molecular weight of vapor, 66.5 lb/lb-mole
T = absolute temperature, 508°R

L_L = see Chart
S = see 1
P = 5.3582
M = 62.437
T = 511.1

Annual Gasoline Throughput, gallons per year, = 19438.3 E^3 gallons

SEPTEMBER

HAPs Compounds	Mole Fraction	L_L (lb/10^3 gal)	Emissions (Ton/month)
Benzene	0.0044	0.0359	0.35
Ethylbenzene	0.0004	0.0033	0.03
Hexane	0.0070	0.0571	0.55
Naphthalene	0.0000	4.86E-06	4.72E-05
Toluene	0.0064	0.0522	0.51
Trimethylpentane (2,2,4)	0.0017	0.0139	0.13
Xylene-m	0.0012	0.0098	0.10
Xylene-o	0.0005	0.0041	0.04
Xylene-p	0.0009	0.0073	0.07
Gasoline (RVP 10) /3	0.9775	7.9721	77.48
TOTAL			79.27
TOTAL--HAPS ONLY			1.78

DECEMBER DECEMBER DECEMBER

L_L = 12.46 SPM/T

where L_L = loading loss, lb/1000 gal
S = saturation factor, dimensionless, 1.0
P = true vapor pressure, 4.0 psia
M = molecular weight of vapor, 66.5 lb/lb-mole
T = absolute temperature, 508°R

L_L =	see Chart
S = see	1
P =	3.9415
M =	62.359
T =	511.1

Monthly Gasoline Throughput,[gallons per month], = 19438.3 E^3 gallons

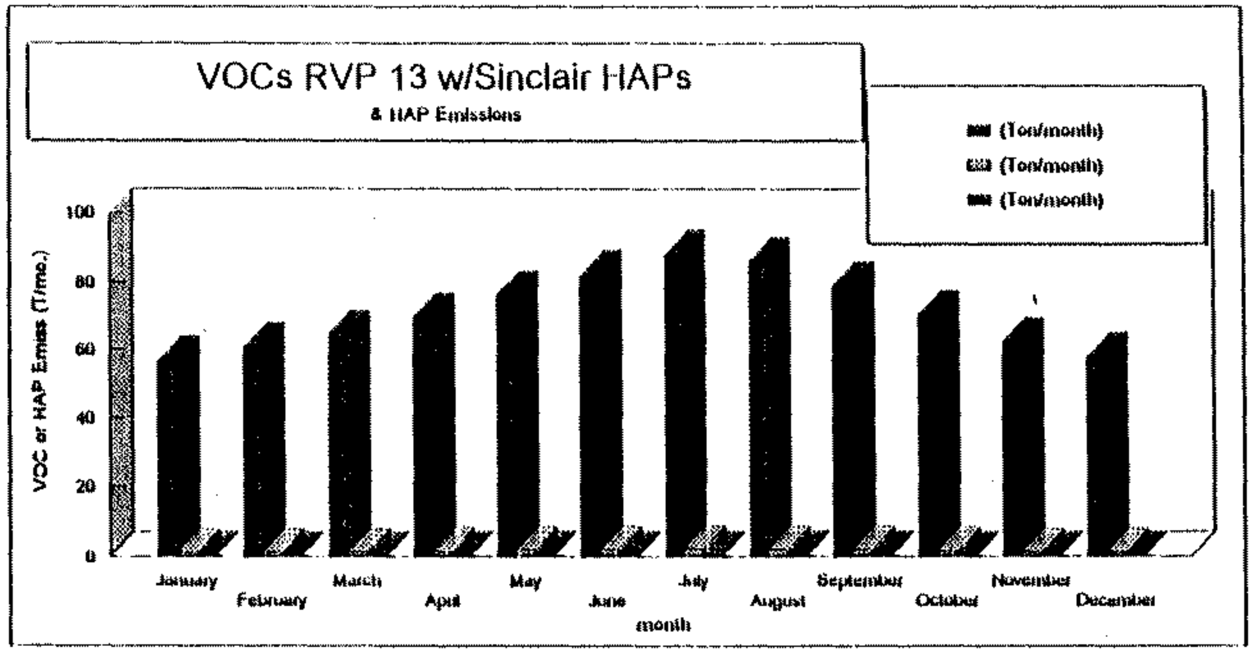
DECEMBER

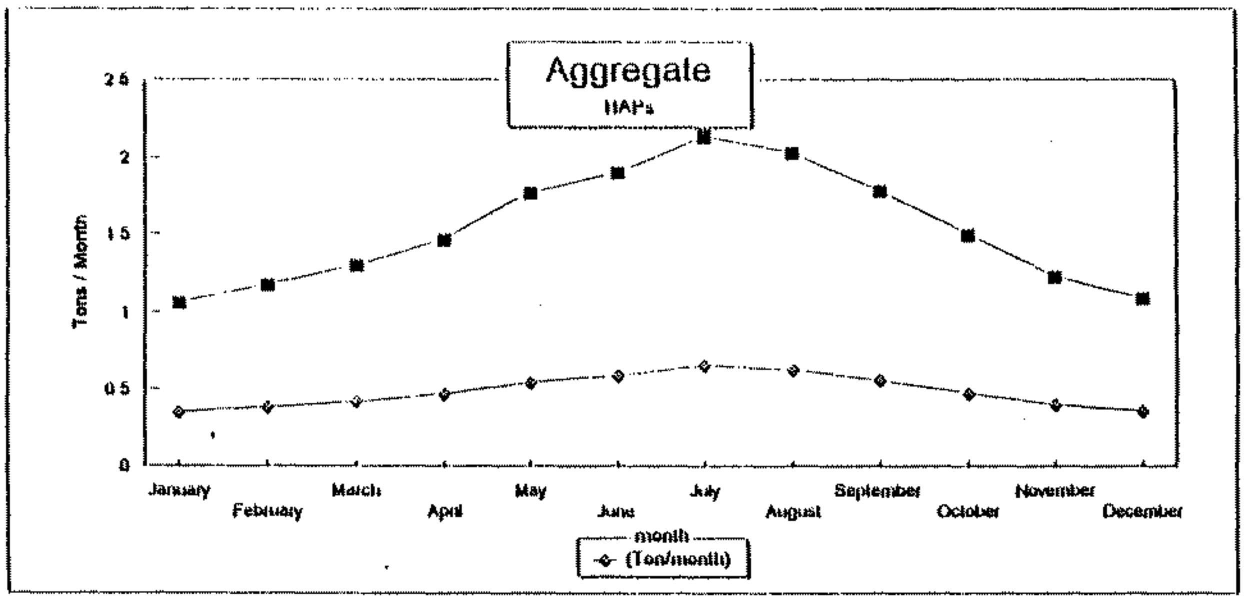
HAPs Compounds	Mole Fraction	L_L (lb/10 ; gal)	Emissions (Ton/month)
Benzene	0.0038	0.0228	0.22
Ethylbenzene	0.0003	0.0018	0.02
Hexane	0.0062	0.0371	0.36
Naphthalene	0.0000	3.57E-06	3.47E-05
Toluene	0.0053	0.0318	0.31
Trimethylpentane (2,2,4)	0.0012	0.0072	0.07
Xylene-m	0.0009	0.0054	0.05
Xylene-o	0.0004	0.0024	0.02
Xylene-p	0.0007	0.0042	0.04
Gasoline (RVP-10)	0.9812	5.8791	57.14
TOTAL			58.24
TOTAL--HAPS ONLY			1.09

ANNUAL LOADING RACK EMISSIONS (RVP 13 with Sinclair HAPs)

VOC Emissions (Ton/yr)	Aggreg HAP Emissions (Ton/yr)	Single HAP Hexane Emiss (Ton/yr)	Single HAP Toluene (Ton/yr)
858.53	18.49	5.83	4.24

	Aggregate HAPs (Ton/month)	Hexane Emissions (Ton/month)	VOC Emissions (Ton/month)
January	1.06	0.35	57.21
February	1.18	0.39	61.12
March	1.30	0.42	64.86
April	1.47	0.47	70.09
May	1.77	0.54	76.64
June	1.91	0.59	82.58
July	2.14	0.65	88.53
August	2.04	0.62	86.43
September	1.78	0.55	79.27
October	1.50	0.47	70.80
November	1.24	0.40	62.78
December	1.09	0.36	58.24


VOCs RVP 13 w/Sinclair HAPs
& HAP Emissions
(Ton/month)
(Ton/month)
(Ton/month)
VOC or HAP Emiss (T/mo.)
100
80
60
40
20
0
January
February
March
April
May
June
July
August
September
October
November
December
month


Aggregate
HAPs
Tons / Month
2.5
2
1.5
1
0.5
0
January
February
March
April
May
June
July
August
September
October
November
December
month
(Ton/month)

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

RVP 13 - SINCLAIR HAP COMPOSITION.

Identification

Identification No.:	401 RVP13
City:	Boise
State:	ID
Company:	Sinclair Oil Corp
Type of Tank:	External Floating Roof

Tank Dimensions

Diameter (ft):	60
Volume(gallons):	839400
Turnovers:	69

Paint Characteristics

Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Paint Condition:	Good

Roof Characteristics

Roof Type:	Double Deck
Fitting Category:	Typical

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal:	Rim-mounted

Roof Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam. Well)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Ungasketed Sliding Cover	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	10
Roof Drain (3-in. Diameter)/Open	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1
Gauge-Float Well (20-in. Diam.)/Unbolted Cover, Ungask.	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1

Meteorological Data Used in Emission Calculations: Boise, Idaho

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 13 with Sinclair	JAN	42.41	39.23	45.60	51.12	3.8727	N/A	N/A	62.354				
Benzene						0.7021	N/A	N/A		0.0188	0.0038	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0573	N/A	N/A		0.0207	0.0003	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						4.8370	N/A	N/A		0.7043	0.9814	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.1875	N/A	N/A		0.0181	0.0062	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.2550	N/A	N/A		0.0151	0.0011	114.22	Option 1
Naphthalene C-10, H-8						0.0010	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.1864	N/A	N/A		0.0972	0.0052	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0690	N/A	N/A		0.0448	0.0009	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0368	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0515	N/A	N/A		0.0448	0.0007	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	FEB	45.64	41.69	49.59	51.12	4.1361	N/A	N/A	62.371				
Benzene						0.7734	N/A	N/A		0.0188	0.0039	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0647	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						5.1633	N/A	N/A		0.7043	0.9806	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.3001	N/A	N/A		0.0181	0.0063	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.3111	N/A	N/A		0.0151	0.0013	114.22	Option 1
Naphthalene C-10, H-8						0.0012	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2078	N/A	N/A		0.0972	0.0054	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0777	N/A	N/A		0.0448	0.0009	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0417	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0581	N/A	N/A		0.0448	0.0007	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	MAR	48.57	43.26	53.89	51.12	4.3878	N/A	N/A	62.386				
Benzene						0.8432	N/A	N/A		0.0188	0.0040	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0721	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						5.4749	N/A	N/A		0.7043	0.9799	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.4099	N/A	N/A		0.0181	0.0065	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.3622	N/A	N/A		0.0151	0.0014	114.22	Option 1
Naphthalene C-10, H-8						0.0014	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2290	N/A	N/A		0.0972	0.0057	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0865	N/A	N/A		0.0448	0.0010	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0466	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0648	N/A	N/A		0.0448	0.0007	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	APR	52.46	45.90	59.03	51.12	4.7407	N/A	N/A	62.405				
Benzene						0.9440	N/A	N/A		0.0188	0.0042	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0831	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						5.9114	N/A	N/A		0.7043	0.9790	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.5673	N/A	N/A		0.0181	0.0067	86.17	Option 2: A=6.8760, B=1171.170, C=224.410

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Isooctane						0.4345	N/A	N/A		0.0151	0.0015	114.22	Option 1
Naphthalene C-10, H-8						0.0017	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2600	N/A	N/A		0.0972	0.0059	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0995	N/A	N/A		0.0448	0.0010	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0539	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0746	N/A	N/A		0.0448	0.0008	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	MAY	56.94	49.41	64.47	51.12	5.1744	N/A	N/A	62.428				
Benzene						1.0722	N/A	N/A		0.0188	0.0043	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0975	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						6.4476	N/A	N/A		0.7043	0.9779	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.7660	N/A	N/A		0.0181	0.0069	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.5209	N/A	N/A		0.0151	0.0017	114.22	Option 1
Naphthalene C-10, H-8						0.0021	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2999	N/A	N/A		0.0972	0.0063	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1165	N/A	N/A		0.0448	0.0011	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0636	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0874	N/A	N/A		0.0448	0.0008	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	JUN	60.89	52.92	68.86	51.12	5.5828	N/A	N/A	62.447				
Benzene						1.1969	N/A	N/A		0.0188	0.0045	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1119	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						6.9519	N/A	N/A		0.7043	0.9770	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.9580	N/A	N/A		0.0181	0.0071	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6006	N/A	N/A		0.0151	0.0018	114.22	Option 1
Naphthalene C-10, H-8						0.0025	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3394	N/A	N/A		0.0972	0.0066	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1334	N/A	N/A		0.0448	0.0012	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0734	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1003	N/A	N/A		0.0448	0.0009	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	JUL	64.94	56.05	73.82	51.12	6.0283	N/A	N/A	62.468				
Benzene						1.3371	N/A	N/A		0.0188	0.0046	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1286	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						7.5016	N/A	N/A		0.7043	0.9760	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						2.1725	N/A	N/A		0.0181	0.0073	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6945	N/A	N/A		0.0151	0.0019	114.22	Option 1
Naphthalene C-10, H-8						0.0030	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3843	N/A	N/A		0.0972	0.0069	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1530	N/A	N/A		0.0448	0.0013	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0847	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1152	N/A	N/A		0.0448	0.0010	106.16	Option 2: A=7.0206, B=1474.403, C=217.773

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline RVP 13 with Sinclair	AUG	63.26	55.14	71.38	51.12	5.8401	N/A	N/A	62.459				
Benzene						1.2774	N/A	N/A		0.0188	0.0046	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1215	N/A	N/A		0.0207	0.0005	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						7.2695	N/A	N/A		0.7043	0.9764	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						2.0813	N/A	N/A		0.0181	0.0072	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.6555	N/A	N/A		0.0151	0.0019	114.22	Option 1
Naphthalene C-10, H-8						0.0028	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3651	N/A	N/A		0.0972	0.0068	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1446	N/A	N/A		0.0448	0.0012	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0798	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.1088	N/A	N/A		0.0448	0.0009	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	SEP	58.75	51.48	66.02	51.12	5.3582	N/A	N/A	62.437				
Benzene						1.1278	N/A	N/A		0.0188	0.0044	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.1039	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						6.6746	N/A	N/A		0.7043	0.9775	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.8518	N/A	N/A		0.0181	0.0070	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.5558	N/A	N/A		0.0151	0.0017	114.22	Option 1
Naphthalene C-10, H-8						0.0023	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.3175	N/A	N/A		0.0972	0.0064	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1240	N/A	N/A		0.0448	0.0012	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0679	N/A	N/A		0.0349	0.0005	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0931	N/A	N/A		0.0448	0.0009	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	OCT	52.97	47.03	58.91	51.12	4.7880	N/A	N/A	62.408				
Benzene						0.9578	N/A	N/A		0.0188	0.0042	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0846	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						5.9700	N/A	N/A		0.7043	0.9789	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.5887	N/A	N/A		0.0181	0.0067	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.4443	N/A	N/A		0.0151	0.0016	114.22	Option 1
Naphthalene C-10, H-8						0.0017	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2642	N/A	N/A		0.0972	0.0060	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.1013	N/A	N/A		0.0448	0.0011	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0550	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0759	N/A	N/A		0.0448	0.0008	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	NOV	46.96	42.88	51.04	51.12	4.2480	N/A	N/A	62.377				
Benzene						0.8042	N/A	N/A		0.0188	0.0040	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0679	N/A	N/A		0.0207	0.0004	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						5.3018	N/A	N/A		0.7043	0.9803	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.3486	N/A	N/A		0.0181	0.0064	86.17	Option 2: A=6.8760, B=1171.170, C=224.410

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Isooctane						0.3341	N/A	N/A		0.0151	0.0013	114.22	Option 1
Naphthalene C-10, H-8						0.0013	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.2171	N/A	N/A		0.0972	0.0055	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0816	N/A	N/A		0.0448	0.0010	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0438	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0610	N/A	N/A		0.0448	0.0007	106.16	Option 2: A=7.0206, B=1474.403, C=217.773
Gasoline RVP 13 with Sinclair	DEC	43.27	40.11	46.44	51.12	3.9415	N/A	N/A	62.359				
Benzene						0.7206	N/A	N/A		0.0188	0.0038	78.11	Option 2: A=6.9050, B=1211.033, C=220.790
Ethylbenzene						0.0591	N/A	N/A		0.0207	0.0003	106.17	Option 2: A=6.9750, B=1424.255, C=213.210
Gasoline (RVP 13)						4.9223	N/A	N/A		0.7043	0.9812	62.00	Option 4: RVP=13.00, ASTM Slope=2.5
Hexane (-n)						1.2167	N/A	N/A		0.0181	0.0062	86.17	Option 2: A=6.8760, B=1171.170, C=224.410
Isooctane						0.2699	N/A	N/A		0.0151	0.0012	114.22	Option 1
Naphthalene C-10, H-8						0.0011	N/A	N/A		0.0013	0.0000	128.16	Option 2: A=7.1463, B=1831.571, C=211.821
Toluene						0.1919	N/A	N/A		0.0972	0.0053	92.13	Option 2: A=6.9540, B=1344.800, C=219.480
Xylene (-m)						0.0712	N/A	N/A		0.0448	0.0009	106.17	Option 2: A=7.0090, B=1426.266, C=215.110
Xylene (-o)						0.0380	N/A	N/A		0.0349	0.0004	106.17	Option 2: A=6.9980, B=1474.679, C=213.690
Xylene (-p) "Paraxylene"						0.0532	N/A	N/A		0.0448	0.0007	106.16	Option 2: A=7.0206, B=1474.403, C=217.773

Months in Report: January, February, March, April, May, June, July, August, September, October, November, December

Liquid Contents	Losses (lbs.): Total Withdrawal	Roof-Fitting	Rim-Seal	Total Standing	Total
Gasoline RVP 13 with Sinclair	176.05	4854.96	656.77	5511.73	5687.78
Benzene	3.31	20.62	2.79	23.41	26.72
Ethylbenzene	3.64	2.03	0.28	2.31	5.95
Gasoline (RVP 13)	124.00	4750.74	642.67	5393.41	5517.41
Hexane (-n)	3.19	32.83	4.44	37.27	40.45
Isooctane	2.66	7.69	1.04	8.73	11.39
Naphthalene C-10, H-8	0.23	0.00	0.00	0.00	0.23
Toluene	17.11	29.60	4.00	33.61	50.72
Xylene (-m)	7.89	5.27	0.71	5.98	13.86
Xylene (-o)	6.14	2.23	0.30	2.54	8.68
Xylene (-p) "Paraxylene"	7.89	3.95	0.53	4.48	12.37
Total:	176.05	4854.96	656.77	5511.73	5687.78

ATTACHMENT E

EPA AP-42 "Interim" Process Fugitive VOC Emission Factors

NEW EQUIPMENT LEAK EMISSION FACTORS FOR PETROLEUM REFINERIES, GASOLINE MARKETING, AND OIL & GAS PRODUCTION OPERATIONS

February 1995

The U.S. Environmental Protection Agency (EPA) evaluated data on equipment leak emissions from the petroleum refining, gasoline marketing, and oil and gas production operations gathered by the American Petroleum Institute and the Western States Petroleum Association. Based on the analysis of the data and incorporation of comments from industry and state and local air pollution control associations, EPA is providing interim emission correlations to estimate emissions from leaking equipment at refineries, gasoline marketing facilities, and oil and gas production facilities. Additionally, average emission factors for marketing terminals are provided. These interim measures may change based on additional input from state and local air pollution control agencies and industry, but are acceptable to EPA from a technical standpoint for immediate use to estimate emissions from leaking equipment.

Since State/local programs may experience some transition time to accommodate new factors, the EPA suggests that any contemplated use of these factors in the near term for submitting information for trading, offsets or netting, 15% plans, or modelled attainment demonstrations, and regulations associated with these programs, be coordinated with the State in which the source is located.

The new equipment leak emission correlations require plant specific data to use in conjunction with the equations provided below. For situations where plant data is not available, estimates must use the existing average factors for leaking equipment from the document "Protocol for Equipment Leak Emission Estimates," EPA-453/R-93-026, June 1993 or the marketing factors provided here. The methodology and supporting appendices used to develop the factors presented below are available on the OAQPS TTN bulletin board (see files: leaks.meth, leaks.A, leaks.B, and leaks.C under Chief/AP42/Q&A). If you have any questions please call David Markwordt at (919) 541-0837 (FAX 0942).

EPA Correlation Approach to Estimate Emissions from Equipment Pieces

The correlation equations shown in the above table can be used to estimate emissions when the adjusted screening value (adjusted for the background concentration) is not a "pegged" screening value (the screening value that represents the upper detection limit of the monitoring device) or a "zero" screening value (the screening value that represents the minimum detection limit of the monitoring device). All non-zero and non-pegged screening values can be entered directly into the correlation equation to predict the mass emissions (kg/hr) associated with the adjusted screening value (ppmv) measured by the monitoring device.

The correlation equations mathematically predict zero emissions for zero screening values (note that any screening value that is less than or equal to ambient [background] concentration is considered a screening value of zero). However, data collected by the EPA show this prediction to be incorrect. Mass emissions have been measured from equipment having a screening value of zero. These default-zero emission rates are applicable only when the minimum detection limit of the portable monitoring device is 1 ppmv or less above background. In cases where a monitoring device has a minimum detection limit greater than 1 ppmv, the default-zero leak rates presented in the table are not applicable. For these cases, an alternative approach for determining a default-zero leak rate is to (1) determine one-half the minimum screening value of the monitoring device, and (2) enter this screening value into the applicable correlation to determine the associated default-zero leak rate.

In instances of pegged screening values, the true screening value is unknown and use of the correlation equation is not appropriate. Pegged emission rates have been developed using mass emissions data associated with known screening values 10,000 ppmv or higher and for known screening values 100,000 ppmv or higher. When the monitoring device is pegged at either of these levels, the appropriate pegged emission rate should be used to estimate the mass emissions of the component.

Table 1

Correlation equations, default zero emission rates, and pegged emission rates for estimating petroleum industry VOC emissions, developed from the combined 1993 refinery, marketing terminal, and oil and gas production operations data[a]

Equipment Type/Service	Default Zero Emission Rate (kg/hr)[b]	Pegged Emission Rates (kg/hr)[c]		Correlation Equation[d]
		10,000 ppmv	100,000 ppmv	
Connector/All	7.5E-06	0.028	0.030	$LEAK = 1.51E\text{-}06 \times (SV)$
Flange/All	3.1E-07	0.085	0.084	$LEAK = 4.44E\text{-}06 \times (SV)$
Open-Ended Line/All	2.0E-06	0.030	0.079	$LEAK = 2.16E\text{-}06 \times (SV)$
Pump/All	2.4E-05	0.074	0.160	$LEAK = 4.82E\text{-}05 \times (SV)^{0.610}$
Valve/All	7.8E-06	0.064	0.140	$LEAK = 2.28E\text{-}06 \times (SV)$
Other[f]/All	4.0E-06	0.073	0.110	$LEAK = 1.32E\text{-}05 \times (SV)$

[a] To estimate emissions: use the default zero emission rates only when the screening value (adjusted for background) equals 0.0 ppmv; otherwise use the correlation equations. If the monitoring device registers a pegged value, use the appropriate pegged emission rate.

[b] Default zero emission rates were based on the combined 1993 refinery and marketing terminal data only (default zero data were not collected from oil and gas production facilities).

[c] The 10,000 ppmv pegged emission rate was based on components screened at greater than 10,000 ppmv; however, in some cases, most of the data could have come from components screened at greater than 100,000 ppmv, thereby resulting in similar pegged emission rates for both the 10,000 and 100,000 pegged levels (e.g., connector and flanges).

[d] LEAK is the predicted mass emission rate (kg/hr) and SV is the screening value (ppmv) measured by the monitoring device.

[e] Only 2 data points were available for the pump 100,000 pegged emission rate; therefore the ratio of the pump 10,000 pegged emission rate to the overall 10,000 ppmv pegged emission rate was multiplied by the overall 100,000 ppmv pegged emission rate to approximate the pump 100,000 ppmv pegged emission rate.

[f] The "other" equipment type includes instruments, loading arms, pressure relief valves, stuffing boxes,

Marketing Terminal Emissions Factors

(based on 17 Marketing Terminals, rec. October 1994, calc. January 1995)

Equipment Type	Equipment Service	Sample Size	Average Emission Factor (Kg/hr)
Fitting (connectors and flanges)[a]	Gas	1,894	4.1E-05
	Light Liquid	42,172	7.8E-06
Other (compressors and others)	Gas	155	1.2E-04
	Light Liquid	2,258	1.3E-04
Pump	Light Liquid	777	5.3E-04
Valve	Gas	873	1.3E-05
	Light Liquid	27,989	4.3E-05

[a] "Fittings" were not identified as flanges or connectors; therefore, the fitting emissions were estimated by averaging the estimates from the connector and the flange equations.

NEW EQUIPMENT LEAK EMISSION FACTORS
FOR
OIL & GAS PRODUCTION OPERATIONS

August 1995

The U.S. Environmental Protection Agency (EPA) evaluated data on equipment leak emissions from the oil and gas production operations gathered by the American Petroleum Institute. Based on the analysis of the data, EPA is providing interim average emission factors from leaking equipment at oil and gas production facilities. These interim measures are acceptable to EPA from a technical standpoint for immediate use to estimate emissions from leaking equipment.

Since State/local programs may experience some transition time to accommodate new factors, the EPA suggests that any contemplated use of these factors in the near term for submitting information for trading, offsets or netting, 15% plans, or modelled attainment demonstrations, and regulations associated with these programs, be coordinated with the State in which the source is located.

If you have any questions please call David Markwordt at (919) 541-0837 (FAX 0942).

Average Emission Factors for Oil and Gas Production Operations
(kg/hr/component)
(sample size is indicated in parentheses)

Equipment Type	Equipment Type/Service			
	Gas	Heavy Oil (<20° API Gravity)	Light Oil (≥20° API Gravity)	Water/Light Oil[a]
Connector	2.0E-04 (36,522)	7.5E-06 (7,338)	2.1E-04 (74,634)	1.1E-04 (2,451)
Flange	3.9E-04 (11,356)	3.9E-07 (3,213)	1.1E-04 (23,581)	2.9E-06 (677)
Open-Ended Line	2.0E-03 (1,030)	1.4E-04 (459)	1.4E-03 (2,678)	2.5E-04 (123)
Other[b]	8.8E-03 (536)	3.2E-05 (194)	7.5E-03 (954)	1.4E-02 (92)
Pump	2.4E-03 (71)	NA	1.3E-02 (162)	2.4E-05 (17)
Valve	4.5E-03 (11,752)	8.4E-06 (2,073)	2.5E-03 (23,723)	9.8E-05 (724)

[a]Water/Light Oil emission factors apply to water streams in light oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[b]The "other" equipment type includes compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents.